Gas Journal

MAY 19, 1937

Vol. 218 89th Year No. 3861

Editorial Notes

Sir David Milne-Watson, Bart.

It was only at the moment of going to press last week that the Coronation Honours List became available to us, and we were therefore able to make merely the briefest of references to the Baronetcy which was awarded to Sir David Milne-Watson. We take this, the earliest, opportunity of expressing more formally the gratification which we share with the whole Gas Industry at the honour which has been paid to one who has devoted his life's work to its service, and of congratulating the recipient with the greatest sincerity in the world.

It would be entirely redundant at this moment to enter into any detail of what Sir David has done for us all. He has been hailed on numberless occasions as the Leader of the Gas Industry, and, even if this is little more than an honorary title, the work has been stupendous which he has been willing and able to undertake on behalf of interests far beyond the bounds of his own huge Undertaking. The fact of the matter is that post-war developments in our Industry and its outside relationships have demanded a personality about whom the many units, the many organizations, could rally to present to the world, both hostile and friendly, a united front and a policy as strong as possible. Sir David has been ready at every fresh call to carry the standard, and incidentally it has been no light weight. He has chosen the route with a vision, and kept to it with a dogged persistence, which have brought us through times of immense difficulty. May we hope that the Joint Committee Report, which holds promise of so much for which Sir David has consistently striven, may be the first indication of smoother roads ahead.

Carbonizing Flexibility

A good deal of investigation and discussion has taken place recently with the aim of increasing the flexibility of carbonizing plant to suit particular market conditions or to utilize the plant to the best advantage in view of such considerations as throughput and fluctuating demands for gas. Investigation has been especially directed to methods of firing the settings and to the possibilities of steaming the charge in horizontal retorts. Some time ago the Fuel Research Board published the results of firing horizontal settings by coal gas, and only a few months ago Mr. Summerson—"Journal" for Oct. 28, 1936—gave an account of work carried out jointly by the Luton Gas Company and the Woodall-Duckham Company into the possibility of firing vertical retort settings partially or wholly by coal gas, the aim being to indicate the increased coke production which would follow from the method of working. The investigation established that there is no technical reason why, if the economic values of coal gas and coke warrant it, partial heating by coal gas should not be undertaken on retort settings suitably adapted for it. The conclusion drawn from that work was that not more than 50% of the heating requirements should be satisfied by coal gas while keeping the producer at work. Again, there appears to be no technical reason why, in a suitably designed plant, all coal gas firing of continuous vertical retorts should not be entirely satisfactory. It may well be that new plant settings will embody means of alternate firing by coal gas and producer gas. In this way coke production could be increased when necessary.

The present position of the coke market renders discussion of alternate methods of firing of practical importance as well as of technical interest, and the Paper which Mr. Dixon, of the Newcastle-upon-Tyne and Gateshead Gas Company, read at the meeting of the North of England Gas Managers' Association is most opportune. The Paper was published in the "Journal" last week, and a report of the discussion will be found in our issue to-day. It is, of course, when the prices obtainable for coke are good that the attractive features of using coal gas as a substitute for producer gas loom large. Such a period occurred in the Newcastle area in 1930, and it was decided to experiment with coal gas firing. Commencing on one bed of Glover-West vertical retorts, the method was gradually extended until nine beds were being fired with purified coal gas; and this required a total of over a million cubic feet of gas each day. The Author outlines the technique of the method, and also, on certain assumptions which he sets out clearly, the economics of the system. He shows that when favourable circumstances exist for heating settings by coal gas a "new and powerful" policy can be introduced. Given such circumstances, adjustment of plant operations can be effected

with greater economy in plant repair, and at opportune times output of coke may be more than doubled. In regard to " compound heating "—addition of coal gas to producer gas—the greatest advantages exist when the plant may be run at a uniform throughput by regulating the extent of coal gas heating to suit seasonal or holiday load fluctuations. In such instances the cost of producing the extra gas will be low, but it may be necessary to provide accommodation for large coke stocks at period of low demand for both coke and gas. Mr. Dixon fails to understand why suitable arrangements should not be made for this.

Use of Coke Breeze

THE other subject dealt with by Mr. Dixon in his Paper is the heating of settings by producer gas from coke breeze and coke dust, here again with the object of making available for sale a greater quantity of large coke. Particular interest lies in the use of a charging skip which distributes the breeze and the fines in such a way that correct positioning in the producer permits of uniformity of operation. The tests have demonstrated that coke breeze 0-1 in. normally obtained from " run of retort " coke can be burned with " reasonable efficiency." The additional work and inconvenience entailed, states the Author, are well compensated for, but a certain amount of technical control, supervision, and regular attention to working details are imperative. Moreover, the breeze burning producer suggests a way for working steam-raising boilers at high efficiency. By using hot producer gas firing on boilers of the Lancashire or Economic types much higher efficiencies and steam raising capacities can be obtained than result from hand firing practice. Mr. Dixon maintains that steam raising plant should therefore be situated as close as possible to the retort house, so that greater use of the common producer gas main could be made. Greater attention, too, should be paid to the supplementary heating of waste-heat boilers by hot producer gas, to balance the variation in demand. The investigations into gas-works fuel problems described by Mr. Dixon are likely to result in others carrying out without trepidation trials of a similar nature when they are of opinion that favourable circumstances exist. Mr. Dixon's Paper is yet another illustration of the remarkable flexibility of the carbonizing process for dealing to the best advantage with changes in market conditions and fluctuations in gas load.

Consideration of the flexibility of carbonizing plant brings to mind the work undertaken at the Fuel Research Station on increasing throughputs of horizontal retorts by increasing the volume of the heating gases being circulated round the retorts. By this means it has been shown that throughputs can be raised considerably—in the setting of retorts at the Fuel Research Station from 10 tons to over 16 tons per day. This matter of increasing the throughput of horizontal retorts has also been attacked from another angle. Some time ago a system of delayed combustion was described in the " JOURNAL " whereby the heating of the setting is effected in multiple stages. The secondary air supply to the heating chamber is restricted so that the primary stage of combustion at the zone of egress of the fuel gases to the chamber is only partially effected. The unburnt fuel gases circulate with the products of the first stage of combustion up through the heating flues to the region of the upper retorts, where a further supply of air or preheated air—" tertiary air supply "—is admitted through ports terminating the preheating flues of a system of recuperation. The completion of combustion of the excess fuel gases results, the products of the complete combustion leaving the flues of the heating chamber by way of a system of recuperation to the main flue. A large increase in throughput of the setting is claimed for this system of heating.

Steaming in Horizontals

ANOTHER Paper bearing on the flexibility of carbonizing plant is published in to-day's " JOURNAL." In it Mr. A. E. Hardman gives the results of steaming the charge in horizontal retorts at the Widnes Gas-Works, where extensive trials have been made. It will be recalled that a large-scale investigation of steaming in horizontal retorts showed that steaming increased the cost of the therm into holder to a considerable extent, due to the reduction in throughput of coal through the settings. Other disadvantages were the increase in the volume of liquor and also the free carbon content of the tar. Of the steam admitted to the retorts comparatively little was decomposed. The results at Widnes show that, with the method of working adopted, steaming can effect an increase of 8 therms per ton of coal carbonized. Mr. Hardman, however, cannot point to any saving in the cost of the therm produced. His calculations indicate that the cost per therm is slightly increased, but not sufficiently to have any appreciable influence on the financial results. Steaming in horizontals is clearly a matter to be considered in the light of particular local circumstances. There may exist in some works a set of circumstances which would render the adoption of the process a reasonable and economic proposition; one cannot generalize as to the advisability or otherwise of steaming in horizontals. The Paper by Mr. Hardman will serve as guidance to those undertakings contemplating the process.

A Monopoly No Longer

IN the last two issues of the " JOURNAL " we have commented on the Report of the Joint Committee on Gas Charges, in which recognition is made of the fact that the Gas Industry no longer enjoys a monopoly. It is interesting in this connection to consider for a moment the phases through which our Industry has passed. Since the days of Elizabeth, when Parliament thought fit to pass a Statute prohibiting monopolies, this country has trusted in the main to healthy competition in industry to regulate and adjust the prices of essential commodities. There were cases, however, in which competition was from the very nature of things absent. Thus, during a substantial portion of the Victorian Era, the Gas Industry had a virtual, if not a legal, monopoly in the supply of lighting. It was therefore necessary for the State, in the interest of the consumer, to prescribe the charges and profits to be made by the authorized gas undertakers of the country. The maximum price and dividend provisions were given general approval in 1847 when the first Gas-Works Clauses Act was passed, and the sliding scale was officially approved in the early seventies.

The two main forms of price and dividend control may be said to have been formulated some seven years before the passing of the first general Electric Lighting Act in 1882. The period between 1847 and 1882 represents the monopolistic period of the Gas Industry and it was during this period that the iron hand of the State secured its hold upon authorized gas undertakers.

No such monopolistic period has ever been known by the electricity industry, for since its inception it has encountered the competition of the Gas Industry. The

early impression, which has never been completely effaced, was that while electricity was the toy of a few rich faddists, the Gas Industry was the stay and support of the great masses of the population. Governmental restrictions have therefore never been so rigid in the case of the electricity industry as in the case of the Gas Industry.

In latter times, when electricity became the favourite of successive Governments, more and more freedom in regard to charges has been conferred while little, if any, restrictions as to profits have been imposed. Year in and year out it has been dinned into the ears of electricity undertakers that the most effective weapon, in its competition with gas, is the weapon of tariffs. The Electricity Commissioners have repeatedly emphasized the importance of attractive tariffs, and the same message has been echoed by dozens of chairmen when presiding at their annual meetings. Not only has full use been made of the power to impose a minimum charge, but two-part and other tariff rates have been designed so as to affect as detrimentally as possible the Gas Industry. In how many cases are consumers who desire electricity merely for lighting, or even wireless, forced to pay upon a high flat-rate tariff, while the lower two-part charge is reserved for those who are willing to consume electricity for cooking or heating. A striking illustration was afforded by the Eastbourne case which came before the High Court. In this case an especially low rate was given to those who did not use gas for cooking, although they were entitled, without sacrificing that low rate, to utilize coal or oil.

All this cleverness was accompanied by a chorus of jubilation from the Electrical Press which never saw fit to mention that electrical progress was mainly due to the heavy legal restrictions imposed upon the Gas Industry.

The Minimum Charge

It is generally admitted that the recommendation of the Gas Legislation Committee over which Mr. Wrottesley, K.C., presided, in favour of granting power to gas undertakers to impose a minimum charge, was well founded from both the commercial and the economic points of view. That recommendation was of the greatest worth to the Industry. Yet it was refused by the Government in 1934, not upon any scientific or logical grounds, but merely because it was considered that it might result in some political detriment to the Government. In one sense all this was extremely flattering to gas, but no industry can subsist on flattery alone.

The normal economic expansion of the Industry was therefore repressed, and such repression in industries as well as nations is bound to lead to an explosion somewhere. The explosion came in South London last autumn, and was, of course, followed by the Enquiry before the Joint Parliamentary Committee of both Houses. The Report of that Committee has been the subject of comment in these columns during the past two weeks, and we have expressed satisfaction with the Committee's recommendation that gas undertakers should be entitled to made a minimum charge. No undertaker would be compelled to enforce a minimum charge, but there is an unanswerable case in favour of their having power to do so, should they think it expedient. Where the minimum charge was applied it would, of course, be subject to section 7 of the Gas Undertakings Act, 1934, which provides that every contract made in like circumstances and for the same purpose shall be alike.

Apart, however, from the specific recommendations of the Report, it is excellent to realize that a Parliamentary Committee has recognized that gas is no longer a monopoly. The competition of electricity, coal, and oil is fully appreciated by the Committee, and due weight is given to the importance of the residuals produced by the Gas Industry.

Further thought on the Report confirms our feeling that it may well come to be regarded as the Magna Carta of the Gas Industry, and it may well be a prologue to an increase of prosperity along well tried paths as well as to the employment of gas for many new purposes.

Non-Toxic Road Tar

At the annual luncheon of the British Road Tar Association Sir David Milne-Watson referred to the approval by the Registrar of Trade Marks of the Association's Trade Mark " Brotox " for non-toxic tar. This, he explained, marked the culmination of much research and experimental work which would, he hoped, lead to a growing demand for tar to be used on roads draining into fishing streams. Actually this research is yet another example of what can be achieved by co-operation, for the Ministry of Agriculture and Fisheries and the Government Chemist's Department both helped to bring the investigation to a satisfactory conclusion. The work entailed in the production of this non-toxic tar is outlined in a most interesting manner by Messrs. W. G. Adam, F. M. Potter, and D. G. Murdoch in *Chemistry and Industry*. The Authors point out that the risk of pollution by drainage from roads surfaced with normal high grade tars is extremely small, and the mileage of roads in Great Britain from which such pollution is possible is also small—probably under 5% of the total. Such risk as may exist is confined to two periods in the life of the road—immediately after treatment, when the tar is fresh, and at a late date if deterioration of the road is allowed to proceed to such an extent that the road actually breaks up and a fresh surface of tar is thus exposed. The use of the new products—the outcome of systematic investigations started in 1925 in the Research Department of the Products Works of the Gas Light and Coke Company—will remove the possibility of damage to fisheries from this cause.

The painstaking manner in which the investigation was carried out is wholly admirable, and the production of a non-toxic tar on a commercial scale by a special process followed. In this process, operated at Beckton, a soft pitch prepared by distillation of dehydrated tar is heat treated, without distillation, at a temperature above 300° C. for a period sufficient to reduce very substantially the amount of phenolic substances present. The product is blended with an oil which has been subjected to thorough washing with acid and alkali, and has been subsequently treated for the removal of excess naphthalene. The tar produced by this process conforms to the British Standard Specification for Road Tar, and possesses excellent setting and lasting properties. It was tested on a practical scale by the Ministry of Agriculture and Fisheries in 1931, and the result confirmed its suitability for use on roads draining directly into fishing streams. Based on this test a comprehensive Specification covering the physical properties of non-toxic tar, and chemical and physiological tests of the aqueous product, has been drawn up by the Government Chemist's Department and the Ministry of Agriculture and Fisheries.

Personal

Coronation Honours.

As we went to press last week we were able to record the award of a Baronetcy to Sir DAVID MILNE-WATSON, Governor of the Gas Light and Coke Company. The whole Gas Industry will join us in congratulating Sir David on this honour.

Sir JOHN CADMAN, Chairman of the Anglo-Iranian Oil Company and Iraq Petroleum Company, a Past-President of the Society of British Gas Industries, has been created a Baron.

Mr. J. W. NAPIER, Engineer and Manager to the Alloa Gas Department, also figures in the Coronation Honours List, being made an M.B.E. Mr. Napier has been actively interested in National Savings matters in Clackmannan and Kinross during the past 18 years, and for a period was a member of the Central Savings Committee for Scotland.

Mr. F. G. SHAW, Engineer and Manager to the Buxton Gas Department, has been awarded the Coronation Medal.

* * *

Our readers will be glad to learn that Sir FRANCIS GOODENOUGH, C.B.E., has now so far recovered from his recent serious illness that he has been able to leave the nursing-home and return to his home.

* * *

Mr. J. ALSOP, who retired from the service of the Bolton Gas Department last November, is now representing Messrs. Firth Blakeley, Sons, & Co., Ltd., in the South of England. Mr. Alsop now resides at Bourne House, Bourne End Road, Northwood, Middlesex. His telephone number is Northwood 230.

* * *

After 34 years' service as Engineer and Manager of the Kirkcaldy Gas Department, Mr. JAMES KINCAID retired on May 15. In 1893 Mr. Kincaid was appointed Gas Engineer and Manager to the Peterhead Corporation, having received his training under the late James McGilchrist at Dumbarton. After five years at the Peterhead Works he was appointed to take charge of the Falkirk Corporation Gas-Works, obtaining a similar position with Kirkcaldy Gas Light Company in 1903, where he remained in charge after the Undertaking was taken over by the Corporation in 1911.

Modern plant has been extensively introduced, and considerable reduction has been made in the price of gas during his tenure of office at Kirkcaldy. Since the transfer to the Town Council, the supply of gas has been extended to Thornton, Kinghorn, and recently to the area formerly supplied by the Dysart Gas Light Company. Recent improvements have included the erection of modern showrooms and offices.

To mark his retirement Mr. James Kincaid was presented with an illuminated address by the staff. Mr. J. M. Dow, who succeeds Mr. Kincaid as Engineer, presided.

* * *

The marriage took place at Romford on May 8 of Mr. ERNEST CLOUGH to Miss Zoever Freer, of Hornchurch.

Obituary

The death has occurred of Mr. HANBURY J. H. THOMAS, a former Managing Director of the Sheffield Gas Company, at the age of 88.

* * *

The death occurred on May 12, at the age of 84, of Sir HENRY BIRCHENOUGH, Bt., G.C.M.G., a Director since 1899 of the Imperial Continental Gas Association. Born in Macclesfield on March 7, 1853, Sir Henry was educated at University College, London, at Oxford University, and in Paris. In his earlier years he took a practical interest in the silk industry of his home town, with which his family had been long connected. He first came into the public eye at the conclusion of the South African War, when he visited that country as Special Trade Commissioner on behalf of the Government. His official report on the position and prospects of British trade in South Africa was an important document, and for this service he was made a C.M.G. He subsequently served on the Tariff Commission and Advisory Committee to the Board of Trade, and in 1906 was appointed a member of the Royal Commission on Shipping Rings. He also extended his interests to the City, becoming a Director of the British South Africa Company.

Sir Henry was made K.C.M.G. in 1916 for his services in Rhodesia, and was created a baronet in 1920. His administrative and financial talent found further scope in the Chairmanship for some time of the Imperial Continental Gas Association and on the Boards of the Rhodesia Railways and the Victoria Falls Power Company. He was promoted G.C.M.G. in 1935. Sir Henry leaves two daughters; there is no heir to the baronetcy.

* * *

Mr. W. A. PAYNE, Chairman and Managing Director of the British Thermostat Company, Ltd., passed away on May 6, after a short illness. Mr. Payne and his brother, Captain M. Payne, who died on Feb. 6 this year, were, with Mr. J. E. Sherlock, the founders of the British Thermostat Company, Ltd., which commenced operations in a modest way at Teddington in 1928. The Company removed to larger works at Windmill Road, Sunbury-on-Thames, two years later, and has since extended considerably. His death has caused a vacancy on the Board of the British Thermostat Company, Ltd., which has been filled by appointing Mr. J. E. Sherlock and Mr. W. F. F. Martin-Hurst joint Managing Directors, and by electing Mr. F. G. Poplett to the Board. Mr. Payne was 38, and leaves a widow.

British Standards Institution

Annual General Meeting and Luncheon

The British Standards Institution will hold its Annual General Meeting at the Dorchester Hotel, Park Lane, W. 1, on the morning of Tuesday, June 8, and this will be followed by a luncheon.

Emphasis is this year being laid on the value of Empire unification in matters of standardization and it is hoped that several distinguished representatives of the Dominions will honour the Institution by their presence at this luncheon.

Members of the Institution are reminded that an early application for tickets is desirable.

Forthcoming Engagements

May.

21.—EASTERN COUNTIES' ASSOCIATION.—Half-yearly Meeting at Aldeburgh.

22.—YORKSHIRE JUNIORS.—Meeting at Halifax; inspection of Gas-Works, and three short Papers by Messrs. C. J. Dougherty, J. Castle, and F. J. Pratton.

24.—I.G.E.—Research Executive Committee; Special Meeting to consider Research Programme for 1937-38, 2.30 p.m.

26.—MIDLAND ASSOCIATION.—Visit to Chesterfield. Assemble at Gas-Works, 11.0-11.30 a.m.

27.—B.C.G.A.—Manchester District Conference at Oldham.

27.—WALES AND MONMOUTHSHIRE ASSOCIATION.—Annual Meeting at Cardiff.

June.

1-4.—I.G.E.—74th Annual General Meeting, Royal Geographical Society Hall, Exhibition Road, Kensington, S.W. 7.

9.—COKE SALESMEN'S CIRCLE.—Visit to Crane, Ltd., Ipswich.

18.—I.C.E.—Special Council Meeting, 2.30 p.m.

18.—NORTH OF ENGLAND ASSOCIATION (AUXILIARY).—Meeting at Middlesbrough.

19.—LONDON AND SOUTHERN JUNIORS.—Summer Visit to Luton.

23.—I.G.E.—Pipe Committee, 3 p.m.

24.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—County Meeting at Luton.

25.—I.G.E.—Joint Lighting Committee, 2.30 p.m.

25.—B.C.G.A.—Scottish Conference at Peebles Hydropathic.

July.

2.—I.G.E.—Joint Committee on Complete Gasification under Pressure, Department of Scientific and Industrial Research, 16, Old Queen Street, S.W. 1, 3 p.m.

9.—SOUTHERN ASSOCIATION.—Summer Meeting at Southampton.

13.—I.G.E.—Council, 10 a.m.

15.—I.G.E.—Gasholder Committee, 2.30 p.m.

News in Brief

CURRENT EVENTS IN THE GAS INDUSTRY

The Lostwithiel Gas Company is about to build new showrooms and offices in Fore Street.

Denny Town Council have approved plans for a combined gas and electricity showroom at Denny.

Applications Are Invited by the Salford Gas Department for the position of Deputy Engineer and Manager at a commencing salary of £750 per annum. Further details are to be found in our advertisement columns.

Application for a Special Order under the Gas Undertakings Acts, 1920 to 1934, is intended to be made to the Board of Trade by the East Retford Corporation with the object *inter alia* of extending the existing limits of supply.

Applications are Invited for the position of Junior Assistant Engineer to the Edinburgh Gas Department, at a commencing salary of £500 per annum, rising to £600 per annum. Further particulars will be found in our advertisement columns.

Attendances Totalling over 1,200 were registered at a series of cookery demonstrations recently arranged by Messrs. Falk, Stadelmann, & Co., Ltd., in conjunction with the Southport Corporation Gas Department. Miss Deakin was the demonstrator.

Presentations were Made on May 15 to ten employees of the Perth Corporation Gas Department who are retiring under the superannuation scheme, which has just come into force. The gifts were handed over by Mr. David Vass, Engineer and Manager, who himself retires in July.

The Gardens bordering the south side of Devonport Park, together with the War Memorial and the Devonport Technical College, will be floodlighted by the Plymouth Gas Department daily from Coronation Day onward until Sept. 26, weather and circumstances permitting.

Mr. Harry Lane, of Messrs. Lane, Fox, & Co., Ltd., builders and contractors, Norton and Sunderland, has purchased the works at Seaham of Coal and Allied Industries, Ltd., which were recently offered for sale by the Receiver appointed by the debenture holders. The works are to be adapted for the making of semi-coke.

The Third Series of the Studd Lectures on Industrial and Commercial Management will be given in the Fyvie Hall, The Polytechnic, 309, Regent Street, London, W. 1, on May 21 and 28, and June 4 and 11, 1937, from 6.30 to 7.30 p.m. Tickets of admission can be obtained on application to the Director of Education at the Polytechnic.

That Any Reduction in the existing charges for gas is undesirable in the best interests of the undertaking was resolved by the Widnes Gas Committee after consideration of a joint report prepared by the Borough Treasurer and the Gas Engineer, Mr. C. E. Dickinson, on the probable effect of a reduction in the price of gas on the revenues of the Gas Undertaking.

"Gas Manufacturing in the Far East—British Plants for Japanese Gas-Works," is the subject of an article by Mr. Walter T. Dunn, formerly Secretary of The Institution of Gas Engineers, in the March issue of the *Far Eastern Review*. In it is described a plant manufactured and erected by the combined firm of Power Gas Corporation and Ashmore, Benson, Pease, & Co.

To Commemorate the Coronation and to bring to the notice of the public the value of gas for all purposes, the Bury Corporation offers to present a Coronation Cake, baked in a "Regulo" controlled gas cooker by a Bury lady, to the person giving the correct or nearest number of persons visiting the Gas-Works during the time they were open for inspection in Coronation Week.

In the May Issue of *Concrete and Constructional Engineering* is an interesting account of the new stores of the Reading Gas Company, which have been built to the designs of Mr. D. H. Helps, Engineer and Manager. Messrs. L. G. Mouchel & Partners, Ltd., were the Consulting Engineers for the reinforced concrete design, and the contractors were Messrs. Collier & Catley, Ltd., of Reading. The building is two storeys high and has a flat reinforced concrete roof. The ground floor and upper floor are similar in design, and the former is independent of any support from the filling below it.

Women are in Despair at Ashington, Northumberland, because the experimental public lighting system plays havoc with make-up. In a distance of 100 yd. complexions are altered three times from the original colouring. At one stage the lights impart a beautiful sunburn glow which might be popular but that it makes carmined lips look blue. At the second stage complexions became too pale, and lips again take on a different colour. The third stage produces a ghost-like effect.

A New Gasholder at Kirkcaldy is to be erected at the Gas-Works between the Esplanade and Links Street, Kirkcaldy, despite a petition signed by the residents. The Town Council on May 10 heard a deputation, but decided to abide by their previous decision. Bailie Grieve, Convener of the Gas Committee, replying to the deputation, said that there had been a campaign of untruths and inaccuracies in the matter. There were only two sites open to the Corporation—viz., Pathhead and at the Gas-Works.

Advocates of a Purer Atmosphere lost the day at Blackburn on May 6. The decision of the Baths Committee to install coal-consuming apparatus for their highly expensive new central baths was challenged at the April Council meeting and was referred back by a large majority with a view to gas being fully considered. The Committee re-affirmed their previous decision, and once again their decision was challenged at the Town Council meeting on May 6. Councillor Whitehead deplored the recommendation that Lancashire coal boilers were to be introduced.

Casual Labour will be Abolished among the 300 gas fitters employed by the Liverpool Gas Company, it is announced by Mr. R. E. Gibson, Chief Engineer of the Company. The present staff will be retained during the summer months. Mr. J. Sandon Stubbs, Secretary and Treasurer, told a meeting of the outdoor employees it was the Company's wish to carry Co-Partnership, as far as was practicable, to a logical conclusion, and as the slack periods of previous years were not so noticeable these days because of increasing business, it had been decided to make the gas fitters a part of the permanent staff.

Amalgamation and Grouping

Pontypool, Blaenavon, and Usk.

Among the purposes of a Special Order for which the Ponypool Gas and Water Company intends to apply to the Board of Trade under the Gas Undertakings Act, 1920-34, is one providing for the vesting in the Company the Undertakings of the Blaenavon Gas and Water Company and the Usk Gas Company, and to extend the present limits of supply to include the areas of the Blaenavon and Usk Companies.

Severn Valley and Nantwich.

The Severn Valley Gas Corporation has agreed to purchase the gas-works of the Nantwich Corporation at a price of £62,000, subject to the Board of Trade's sanction.

Midland Association to Visit Chesterfield

Interesting Programme Arranged

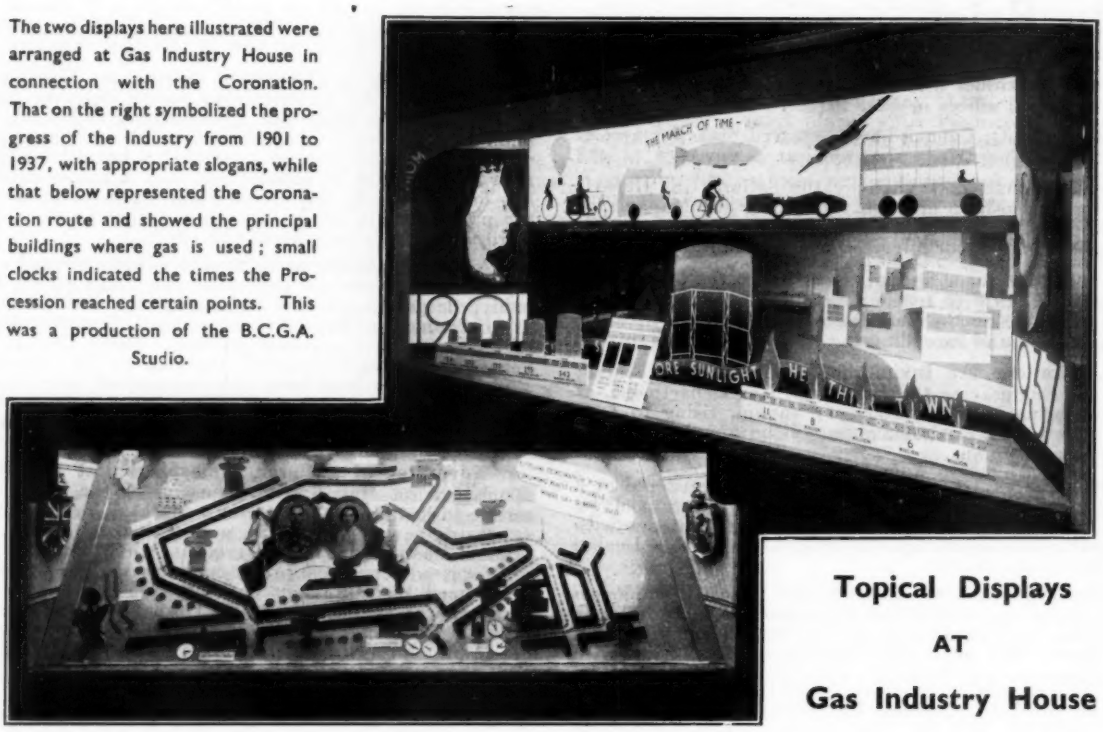
The Spring General Meeting of the Midland Association of Gas Engineers and Managers will be held at Chesterfield next Wednesday (May 26), when an exceedingly interesting programme has been arranged.

Assembling at 11 a.m., the members will first inspect the Chesterfield Gas-Works, in charge of which is their President (Mr. Harold Davies). Luncheon will follow at the Station Hotel by kind invitation of the Mayor and Corporation of the Borough, after which a visit will be paid to the lamp works of the British Thomson-Houston Company, Ltd.

Finally, an inspection will be made of the works of the Chesterfield Tube Company, Ltd., by whose kind invitation tea will be provided.

Mr. Therm Sees it Through

The two displays here illustrated were arranged at Gas Industry House in connection with the Coronation. That on the right symbolized the progress of the Industry from 1901 to 1937, with appropriate slogans, while that below represented the Coronation route and showed the principal buildings where gas is used; small clocks indicated the times the Procession reached certain points. This was a production of the B.C.G.A. Studio.



Topical Displays

AT

Gas Industry House

Worcester Company's Contribution

Gas Flares at the Guildhall

An important part in the beautifying of Worcester for the Coronation was taken by the Worcester New Gas Light Company.

The lovely façade of the Guildhall was effectively illuminated by a line of ten tall gas flares which threw into effective relief the mellow bricks and royal statues. Large crowds gathered to see the flames, and expressions of admiration both at the novelty of the idea and the beauty of its execution were many.

Equally picturesque was the lighting of the interior of the gateway and the courtyard of the Old Prison by gas torches. In the brilliant, flickering light of the torches the massive gateway assumed an almost mediæval aspect.

A special type of light made at the Gas-Works was used for floodlighting the gas offices and showrooms. Four funnel-shaped screen lights—red, white, and blue in colour—were illuminated from inside, the light being reflected right up the building and picking out the handsome architectural details.

"Leave It To Me"—

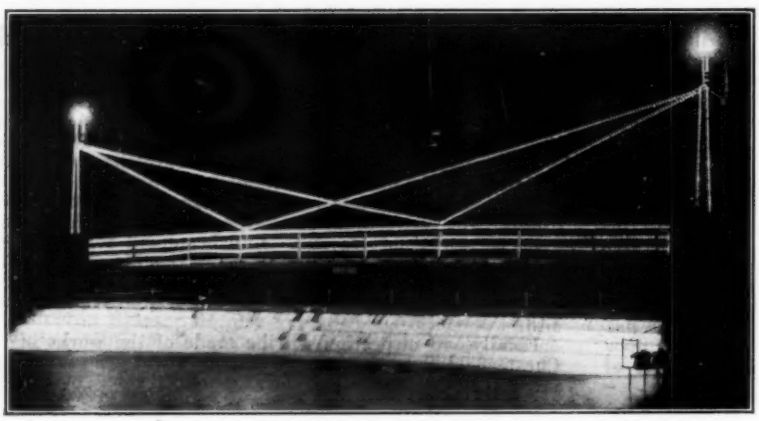
—Says Public Servant No. 1

"Mr. Therm Sees It Through" ran the caption of an advertisement which the Gas Light and Coke Company inserted in the National Press and London evening papers last week. Attention was drawn to the following ways in which gas played an important part in making the Coronation celebrations the success they were.

"Exquisite floodlighting. . . . *Quick meals for millions on the route* . . . powerful street illuminations . . . *perfect cooking for Royal Banquets*, and hundreds of brilliant dinners in Town. . . ."

"Gas to bathe St. James's Park in floodlight—300 gas lamps, four miles of extra piping . . . gas the only source of cooking heat in all the buffets along the route. . . . Gas to light three-fifths of the route—Parliament Street, Whitehall, Pall Mall, Piccadilly, Regent Street, Constitution Hill—3½ miles in all . . . gas flambeaux blazing on gaily decorated street refuges in Piccadilly, St. James's Street, Whitehall and Pall Mall . . . gas to triple the normal illumination of Parliament Square . . . gas for the great hotels, for clubs and restaurants and homes—for Royal Banquets and loyal dinners everywhere in Town!"

A Splendid Example of Gas Floodlighting



AND

Decorative Illuminations

The Mill Bridge, Leamington

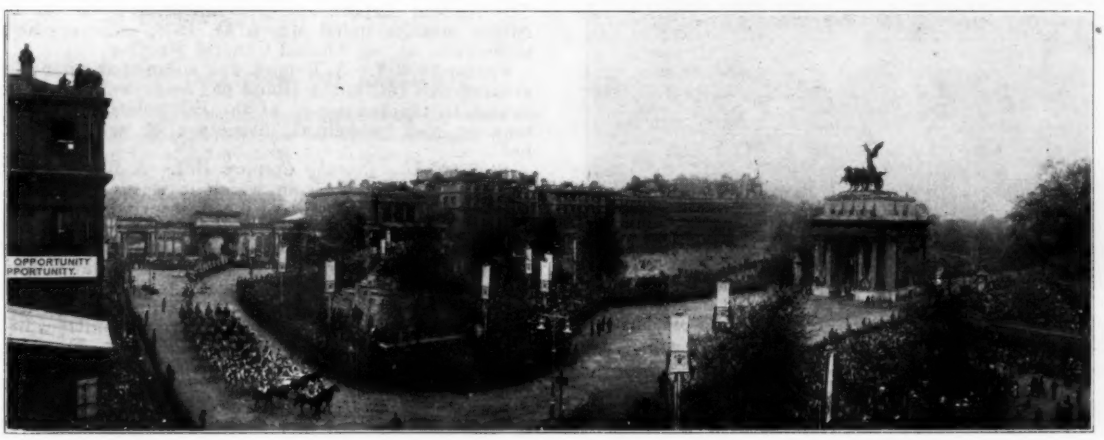
This beautiful effect was obtained by the Leamington Priors Gas Company by a combination of gas floodlighting of the waterfall and the outlining of the bridge itself by nearly 2,000 star jets, each giving six separate jets of flame. At each end of the bridge open flares will be noted. In addition the top of the Pump Rooms, the Hitchman Fountain, and the War Memorial at Leamington are being floodlighted with various types of gas floodlighting lamps.

Coronation News from Near and Far

Ipswich Gas Light Company IN Local Procession

This lorry, specially decorated for the occasion by the Ipswich Gas Light Company, took part in the Coronation Procession in that town and created much interest. The date shown on the vehicle refers to the incorporation of the undertaking.

How Gas Industry House saw the Coronation Procession.



Gas Floodlights Buxton Town Hall

This photograph shows the excellent results obtained by gas in floodlighting the Town Hall at Buxton. The gas flares on the Tower of the building will also be noted.

British Fuel for Coronation Troops

Thousands of gallons of motor spirit were required for the troops in the London Coronation Camps. Tommies are here seen unloading supplies of National Benzole Mixture.

Third International Gas Union Congress

Programme of Paris Meeting

The Third Congress of the International Gas Union will be held in Paris from June 12 to 16, when the following programme has been arranged :

SATURDAY, JUNE 12.—Opening and Solemn Session of Congress.
Reception Speeches.
General Meeting of Delegates and Ladies at the Cité Universitaire (visit and tea).

SUNDAY, JUNE 13.—Visit to the Gennevilliers Gas-Works (Société d'Eclairage, Chauffage et Force Motrice).
Lunch and visit to a Chateau in the Ile de France.

MONDAY, JUNE 14.—Reports and Conferences.
Visits to the laboratories of the Société du Gaz de Paris ; the workshops of the Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz à Montrouge ; Cornillon Gas-Works (Société du Gaz de Paris) ; Technical visit to the Exhibition.
Banquet.

TUESDAY, JUNE 15.—Reports and Conferences.
Meeting in the afternoon at the Hotel de Ville.

WEDNESDAY, June 16.—Reports and Conferences.
Closing Session and passing of resolutions.
Night at the Opera.

An attractive programme of social visits and amusements has been arranged, including excursions and sightseeing tours for the ladies of the party.

Publicity Efforts in New Zealand

A very successful series of cookery demonstrations in conjunction with a gas exhibition, was recently organized by the Auckland Gas Company. Our photograph shows the spacious demonstration platform from which the lectures were given.

Manchester District Association

Visit to the Haweswater Works

A very enjoyable day was spent on Saturday, May 1, when members of the Manchester District Association of Gas Engineers and their ladies participated in a combined visit of Engineering Institutions to the Haweswater Works of the Manchester Corporation.

The other Institutions taking part in the visit were : The Institution of Civil Engineers (Manchester and District Associations), the Institution of Mechanical Engineers (North-Western Branch), the Institution of Structural Engineers (Lancashire and Cheshire Branch), the Institution of Municipal and County Engineers (North-Western District), the Institution of Electrical Engineers (North-Western Centre), and the Manchester Association of Engineers.

Arrangements were made by Mr. H. G. Waters, of the Manchester Water Department, and a committee of Representatives of the various Associations, and the excellent organization, combined with ideal weather, made a most successful outing. The party numbering 390 were accommodated in a special train from Manchester to Shap Summit, and meals were served *en route*. The members were then conveyed by motor coaches along the five miles of private road to the dam in Mardale Valley where construction was in progress. The unique design of the dam was of considerable interest.

After tea in the recreation rooms a very enjoyable feature was the drive along the lakeside, inspecting *en route* the hotel which the Corporation is building to replace one which will be submerged when the level of the lake is raised. Mardale Church and village have already been removed. On returning to the Recreation Hall an explanatory statement was made by Alderman W. Walker, J.P., Chairman of the Waterworks Committee. A vote of thanks to the Manchester Corporation and to Mr. Waters was carried with acclamation, and congratulations were expressed to Mr. Lewis, the Chief Engineer, and Mr. Jamieson, the Resident Engineer, on the conception and execution of the scheme.

As many of the members of the Gas Engineers' Association had travelled long distances to join the excursion, as, for example, from Leeds, Sheffield, Liverpool, and Chesterfield, the return journey completed a long but happy day.

National Gas Council

Meeting of the Central Executive Board

A meeting of the Central Executive Board of the National Gas Council was held at Gas Industry House on Thursday, May 6.

Nomination of Candidate for the Position of President.—Sir David Milne-Watson was unanimously nominated candidate for the office of President of the Council, for submission to the Annual General Meeting to be held that afternoon.

Resignation of Mr. W. E. Price.—A letter was read from Mr. W. E. Price, resigning from the office of Hon. Secretary to the Council. It was decided with regret to ask the members of the Council at the Annual Meeting to accept Mr. Price's resignation, and the Secretary was instructed to communicate with Mr. Price, expressing the deep appreciation of the Board of the many services which Mr. Price had rendered to the Council since his acceptance of the office at the formation of the Council in 1916.

Nineteenth Annual Report and Statement of Accounts.—The Annual Report and Statement of Accounts for the twelve months ended March 31, 1937, were approved for submission at the Annual General Meeting.

Factories Bill.—A Report was submitted upon the progress of this Bill in the House of Commons. Attention was drawn to the provisions of the Bill relating to the maintenance and periodical inspection of water-sealed gasholders.

Staffordshire County Council Bill.—A Report upon this Bill was circulated, from which it was noted with satisfaction that a Clause had been inserted providing that where the operations authorized by the Bill rendered it reasonably necessary so to do, Public Utility Undertakers could remove their mains, pipes, or cables, at the expense of the County Council.

Coal.—Reports were given of the proceedings at meetings of the District Joint Consultative Committees in South Wales, Forest of Dean, Northumberland, Durham, and Scotland.

Joint Committee of the House of Lords and the House of Commons on Gas Prices.—The Report of the Joint Committee was received with satisfaction, especially the recognition by the Committee that the Industry should be freed from unnecessary restrictions. Doubt was expressed regarding the recommendation that when a Company desires to increase the ordinary price by more than 12½% within a period of three years, the sanction of the Board of Trade should be obtained. It was felt that to express in terms of a percentage the amount of an increase in the ordinary price for which sanction was required would prove inequitable in practice.

Date of Next Meeting.—In view of the fact that the first week in June would be devoted to the Annual Meeting of The Institution of Gas Engineers, it was decided that the next meeting of the Board should take place on Tuesday, July 13, at 2.30 p.m.

Illuminating Engineering Society

New Officers

In the Report of the Council presented at the Annual Meeting held in the Hall of the Institution of Mechanical Engineers on Wednesday, May 19, it was announced that Dr. S. English will become President for the next session. Mr. F. C. Smith and Mr. W. J. Jones will become Vice-Presidents, Mr. J. S. Dow will continue to act as Hon. Secretary, and Mr. E. Stroud will continue to act as Hon. Treasurer.

Among those filling vacancies on the Council are Mr. A. M. Bell and Mr. C. A. Masterman.

SOUTH SUBURBAN SALES COACH PREPARED FOR

The Carnival

An award on its very first appearance was the achievement of this Sales Coach of the South Suburban Gas Company, which has been specially decorated in National colours for taking part in local Carnival Processions, &c., in different districts of the Company's area of supply.

Prizes for Articles on Lighting

Highways and Bridges arranges competitions for monthly prizes for its readers, and the issue for May 5 contains questions which may be of interest to our readers.

Subject to the rules and other details which are published in our contemporary, awards of 3 guineas, 2 guineas, and of technical books are offered for the best answers to:

Question 89.

Write an essay of about 1,500 words on "Modern Systems of Lighting for Arterial Roads."

Question 90.

Give a longitudinal and a cross-section of a pedestrian subway, figuring the principal dimensions, and add a plan to show a method of accommodating perambulators at the approaches. The type of construction and methods of lighting are left to the discretion of the competitors.

The closing date is May 31, and any of our readers who are interested are recommended to obtain a copy of *Highways and Bridges* for May 5.

S.B.G.I. Golfing Circle

Meeting During Institution Week

The Society of British Gas Industries Golfing Circle is holding its Spring Meeting at Highgate Golf Club, London, N. 6, on Monday, May 31, and cordially invites golfing members of The Institution of Gas Engineers attending the Annual General Meeting of the Institution to take part in the Competitions that day.

The programme has been arranged as follows: During the day there will be 18 holes Medal play for the "Thornton Victory Cup" for members of the S.B.G.I., and the "Coronation Plate" for members of the Institution. For the afternoon only there will be 18 hole foursomes against bogey for prizes presented by a member of the Circle. Those taking part should tee off as soon after 9.30 a.m. as possible. Cards in both competitions are returnable by 6 p.m. An optional sweepstake of 2s. 6d. will be held in conjunction with each competition.

The Highgate Golf Course is easily accessible, and the directions for reaching it are as follows: From Moorgate, City, by tram to Highgate Tube Station, or 'bus from London Bridge to Highgate tube station. 'Buses along Tottenham Court Road to Highgate tube station. From Highgate tube station by 58 'bus to Wellington Hotel, thence footpath to the Club. By car *via* The Angel, Holloway Road, and Archway Road, turn left at the Police Station along Church Road and View Road into Denewood Road. By car *via* London Exit 1 as far as The Spaniards Inn, then Hampstead Lane, Sheldon Avenue, into Denewood Road. Caddies' lunch and tea will be available at reasonable charges, the green fee being 4s.

Entry forms are obtainable from Mr. W. R. Edgar, Hon. Secretary and Treasurer, Blenheim Works, Hammersmith, W. 6, and should be returned to him before May 28.

Seven Years' Contract Secured from Electricity

Some Further Particulars from Bideford

We are indebted to Mr. J. H. Lowther, Engineer and Manager of the Bideford Gas and Coke Company, for these further particulars regarding the seven years' contract secured from electricity for the public lighting of Great Torrington. We referred briefly to this success in our issue of April 28.

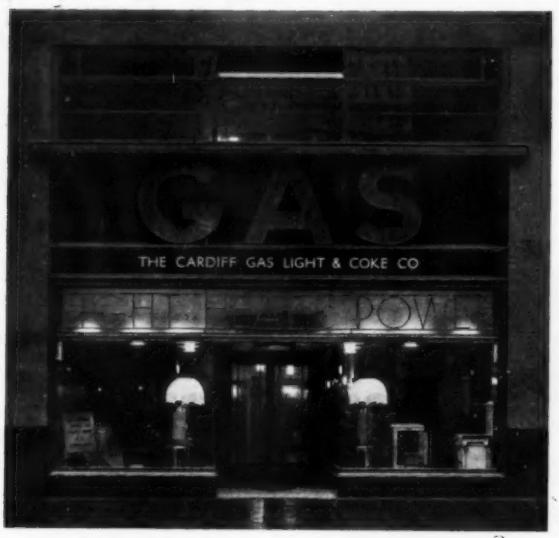
The number of electric lamps displaced is 77, and the same number of gas lamps will replace them. The types and sizes of the lamps it is intended to install are "Windsor" lamps with three No. 1 mantles in alignment, with reflecting device. When tenders were first submitted, it was recommended by the Lighting Committee of Torrington that the electric tender be accepted, but in General Meeting it was decided to have tests of both gas and electric lamps before finally deciding. After this decision had been made, a rumour was circulated that the Home Office had recommended local authorities to give preference to electricity for public lighting, as facilities for "blacking out" in the event of air raids were available in the case of electricity—the public lighting being on a separate circuit. This, as may be imagined, caused much concern in Torrington. However, the Company made enquiries regarding the instructions from the Home Office, and found that the rumour was entirely unfounded. They, therefore, flatly denied the rumour, and pointed out at the same time that, should the necessity arise, they would be prepared to fit all public lamps with "pressure wave" attachments, which would be just as effective as the scheme adopted by the electricity people.

The specimen lights were fixed, and the Council, having inspected them, decided to accept the Gas Company's tender.

Cardiff—Then and Now

From Victoria to George VI.

The choice of Mr. H. D. Madden, M.Inst.C.E., as President—for the third time—of the Wales and Monmouthshire Association of Gas Engineers and Managers, in the Centennial Year of the Cardiff Gas Light and Coke Company, is both a well-deserved tribute to him and a compliment to the Company to which he has self-sacrificingly devoted so many years of his life. The celebration of the Company's Centenary coincident with the half-yearly meeting of the Association, will afford his fellow-members an opportunity, of which they will not be slow to avail themselves, of doing honour to a Company and to a President to whose consistent and generous support so much of the present strength of the Association is due.



The Cardiff Gas Showrooms.

Many names that will never fade from the records of the great Gas Industry have been associated at one time or another with the gas supply of Cardiff, but for many years now the present Chief Executive Officers—Mr. Madden as Engineer and Manager, and Mr. R. J. Auckland, F.C.I.S., as Secretary—have been, hand in hand, leading the Company on from success to success. No longer a purely local business undertaking, the bold and far-sighted policy pursued in connection with its affairs, and the widespread activities of these two gentlemen, have made the Company a national influence—a status to which the paramount position of Cardiff in the economy of Wales so fully entitles it.

In reality, a century is not a very long time for the fashioning of the complete social service which the city possesses in its gas supply to-day, from the very small beginnings of the earlier part of last century. These beginnings date back to some years before the formation of the present Company, inasmuch as in 1821 there was a proposal for lighting the town with gas, put forward by a Mr. Broadmeadow, of Gloucester. He secured an agreement for a term of years, and a gas-works was erected upon a site later occupied by the fish market. Evidence of these old works still remains in the form of cast-iron retorts which are built into the wall flanking the west side of the Glamorgan Canal at this spot. This supply, however, failed to give satisfaction, with the consequence that in 1836 a public meeting convened by the Mayor resulted in the formation of the Cardiff Gas Light and Coke Company for more effectually lighting the town.

The Mayor, Mr. Charles Crofts Williams, was appointed first Chairman, a position in which he continued until his death in 1860. Parenthetically, it may be remarked that, throughout the hundred years that have since elapsed, the Board of Directors has included a member of the family of the original Chairman. The present Chairman, Mr. Robert H. Williams, who has only just been appointed to that position, is a grandson of the first Chairman. For twenty years Mr. Robert Williams was Master of the Glamorgan Hunt.

Coal Export and Utilization.

Both the city and its Gas Company are what they are by reason of coal. A hundred years ago, the population was about 6,000, but just after that time (in 1840) the first cargo of South Wales steam coal was exported from Cardiff, and its excellence for steam generating, and its freedom from smoke, have since then made its sale and export the main industry upon which the district has depended. A phenomenal increase in trade led to the rapid rise of the port, so that at present the population of the city numbers between 200,000 and 300,000. The world-wide trade depression hit the locality severely, but the clouds are breaking, and one looks forward to the time when the sun of prosperity will shine again upon the beauties of Cardiff as brightly as ever it has done in the past. What these beauties are, there is no need to remind members of The Institution of Gas Engineers who enjoyed the good fortune of visiting the city for the meeting in 1928 under Mr. Madden's Presidency. They will remember well the magnificent group of public buildings in Cathays Park, right in the heart of the city. It is the possession of these buildings, surrounded by parks and gardens, that is now, perhaps, the chief glory of Cardiff.

To assist in its rapid rise in the world of commerce, Cardiff, of course, required an adequate gas service, and this the Company promptly took steps to furnish, and have ever since maintained. The erection of their first works they entrusted to Messrs. T. G. & J. Barlow; the site being in Bute Terrace, where the manufacture of gas was not finally abandoned until 1907. Long before this, however, enlargement of the area of supply, and constantly growing demands for gas, called for the provision of additional gas-making plant, and ground for the purpose was acquired at Grangetown, where the construction of the present works

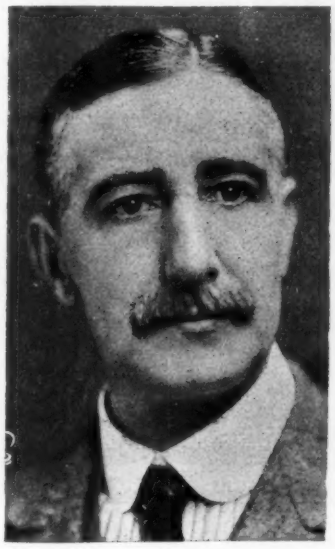
A Panoramic View of Cardiff's Civic Centre.

was begun in 1863. Here the processes in use have been constantly and consistently modernized.

The first published report of the Directors, dated January, 1840, stated that there were at that time 63 public lights and 93 private lights. The earliest recorded Manager and Clerk appears to have been Mr. Henry Bowen, who subsequently became Mayor of Cardiff. From the very small beginnings that have been indicated here, the business has grown until to-day the manufacturing station at Grangetown has to meet the requirements of over 67,000 consumers, of whom approximately one-half are supplied through prepayment meters.

What Service Means To-Day.

To meet the needs of this large number of consumers, five showrooms have been provided over the area of supply. For a long time the city showrooms were in Queen Street, but when it became apparent that these were inadequate to meet new conditions, a new site was secured in St. John's Square. Here Mr. Madden planned to erect premises worthy in every way of the Company, and it may be said that the showrooms he has provided are admired by all who visit them.



Mr. H. D. MADDEN, Engineer to the Cardiff Gas Light and Coke Company since 1906.

The frontage is designed to form a striking advertisement, in which the word "Gas," in big block letters, is illuminated. The interior walls are panelled in light oak, and the layout of the main showroom is such as to give easy access to all apparatus displayed. The hot-water section is particularly attractive, being in the form of panelled recesses, enabling the appliances to be shown working as they would in the home of the consumer. Specially designed lighting fittings were supplied by Messrs. Falk, Stadelmann, & Co. These are operated by pneumatic switch control, there being no chains or levers, and no pipes are exposed.

The first floor appeals specially to the ladies. On the one side there is a very fine lecture and demonstration hall, with a background comprising a complete built-in cabinet arrangement, with refrigerator and sink—the whole finished in a pleasant shade of green, which does not tire the eyes of the audience who may be watching the processes carried out on the platform. Here, again, the lighting is distance-controlled, the attractive lanterns having been supplied by Messrs. William Sugg & Co. On the other side is an innovation in the form of a rest room for lady consumers, and particularly for the members of the Cardiff Women's Gas Council, which has a membership of close upon 560. The lighting here is controlled on the Horstmann system.

The works at Bute Terrace provide an excellent service depôt, and an old retort house is now transformed into a magnificent stores. The stove shop is equipped with the most modern of methods relating to the renovation of cookers, both black and enamelled, while the meter repair shop at present handles over 10,000 meters yearly.

For a long time past the policy of the Company has been to develop to the utmost the research side of the business, and a trained staff is engaged in testing the appliances that are placed on the district. The policy of research, however, has proceeded a long way further than this; for, as is well known, an Industrial Department for providing information regarding heat treatment and commercial applications of gas has been formed. This is now the Industrial Gas Development Centre for South Wales, and eighteen contributing undertakings are associated with the work carried out there.

Team Work.

The activities which have been touched upon here are but a few of the many outward and visible signs of an enlightened outlook upon a great Industry. There are many more such signs. But, in addition to all this, there is that which makes itself known mainly by results—a spirit of loyalty and comradeship which is disseminated through all ranks of the Company's service. An "invisible" spirit, perhaps, but one which impresses itself upon the visitor almost immediately he crosses the threshold of works or offices. When the importance of "team work"—the true co-operative spirit—is understood throughout industry as well as it is to-day throughout the Cardiff Gas Company, strife between employers and employees will make less call upon the space of the newspapers. For nearly thirty years Cardiff has been a Co-Partnership Company, and, under the leadership of Mr. Madden and Mr. Auckland, the principle is interpreted in the deepest and the widest sense.

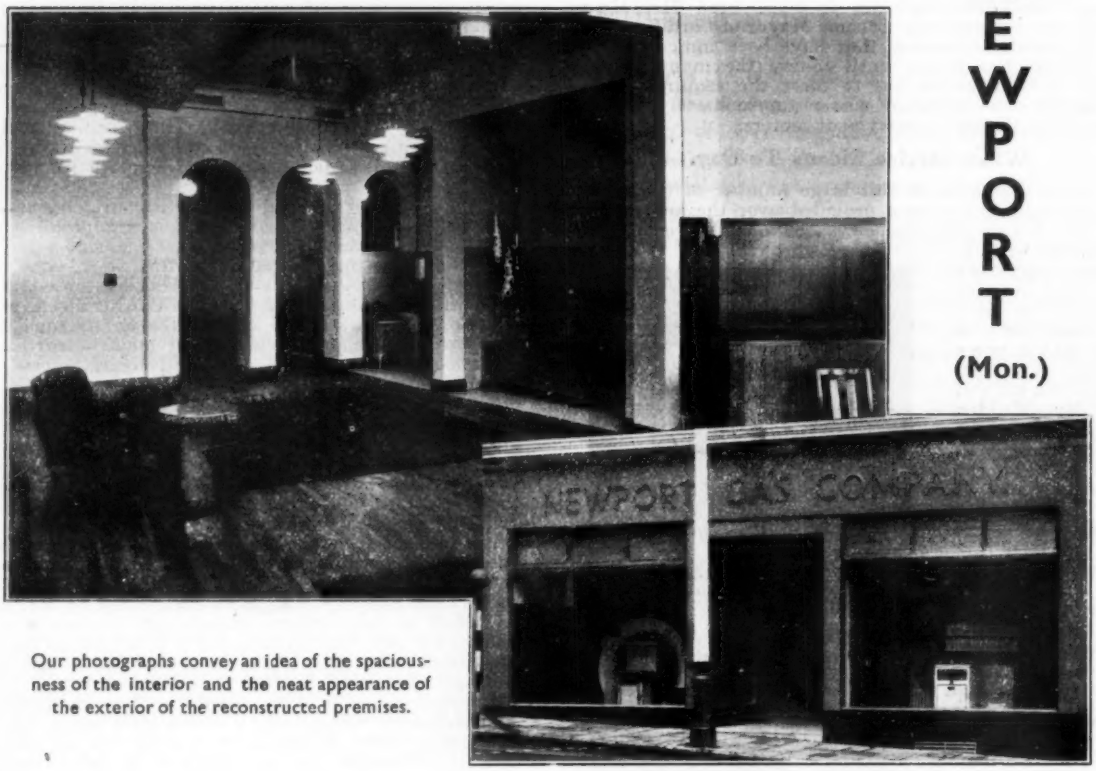
No opportunity is neglected of encouraging that true co-partnership spirit which is the surest of all roads to success. Readers who witnessed the incident will remember a striking manifestation of this spirit—and of the affection in which Mr. Madden is held by those who work under him—during the memorable Cardiff Meeting of the Institution, when, on the visit to the Grangetown Works, an employee stepped forward and made a surprise presentation to Mr. Madden of a gold cigarette case, as an expression of goodwill and esteem on the part of the whole of the staff and workmen.

There is in force a superannuation scheme for the staff, and an *ex gratia* pension scheme for the workmen. The feeling of comradeship and the team spirit are also cultivated on 9 acres of ground at Grangetown, set aside for the purposes of a big athletic club, having about 700 contributing members. Here are practised all manner of outdoor sports in the summer, while there is suitable accommodation for dancing, whist drives, smoking concerts, &c., in the winter. This successful Athletic and Social Club had its origin in an early effort by Mr. Madden on behalf of the workers—namely, the organization of an annual air rifle competition, for a prize which he himself presented. The prizes now competed for in the athletic club include both "Madden" and "Auckland" Cups.

Depending, as it does, upon the two industries—coal and shipping—which have suffered most markedly during the recent years of depression, Cardiff has not been without its difficulties, but the business of the Company has continued to progress, and the optimistic outlook by which its policy is dictated has been undimmed. Old methods to be improved, new schemes to be put into operation, fresh ideas to be "tried-out"—work there is in plenty. Yet, like so many busy people, both Mr. Madden and Mr. Auckland find time to devote to other local activities, and to the performance of official duties in connection with the national organizations upon which the Gas Industry as a whole is so largely dependent. For example, Mr. Madden is a member of the Development Committee of the Cardiff Corporation, and a Past-President of the Publicity Club; while Mr. Auckland, who has spent the whole of his business life—very nearly 43 years—with the Cardiff Gas Company, has presided over the South Wales and Monmouthshire Branch of the Chartered Institute of Secretaries, and has been President of the Cardiff Rotary Club. Mr. Octavius Thomas was followed by Mr. Auckland as Joint Secretary of the South Wales Regional Gas Council. These are but a few instances of their local activities, but they are sufficient to indicate how generously the Chief Executive Officers, in their own lives, act up to the motto of the Cardiff Gas Company, which is "Service."

Mr. R. J. AUCKLAND, Secretary of the Company.

Gas Showrooms Modernized at NEWPORT (Mon.)



Our photographs convey an idea of the spaciousness of the interior and the neat appearance of the exterior of the reconstructed premises.

Fully upholding the prestige of gas service in the town and yet not lacking in that homely atmosphere so essential to the stimulation of business in a community which has had more than its share of the recent industrial depression, the new showrooms of the Newport (Mon.) Gas Company were opened on Saturday, May 8. Perhaps in this instance, however, it is necessary to qualify the adjective "new." It would in one sense be more correct to say "reconstructed" showrooms, but the use of the word would be rather unhappy, because it hardly does justice to the sweeping nature of the work now so successfully concluded. "New" alone can with any fairness qualify these fine premises which, we learn, have created business since their opening in excess of that previously obtained by their predecessors in a corresponding period, despite the fact that the temporary showroom equipped during the reconstruction was still doing business, and the citizens of Newport were very properly engaged in a loyal observance of the Coronation.

With due deference to those responsible for the old premises, in latter years the management of the Undertaking became increasingly aware of their shortcomings. They were built in the days of stern stuff, when æstheticism was subordinated to utilitarianism. And even in Newport, whose proudest citizen would not make so bold as to claim a Bond Street, it was felt that a showroom more in keeping with the prestige of the Undertaking should be proceeded with without delay.

Without disturbing their tenants in the offices over the old premises, the Company proceeded with the work of reconstruction. The contractors for the work had no easy task, for the whole of the ground floor of the building, which comprises four storeys, had to be taken out, dividing walls had to be removed, and the building had to be shored up to enable this work to be carried out. The original ground floor had a chimney stack in the centre, and this was successfully removed to make a spacious interior. This gave them the free hand that was necessary in the work of reconstruction, further details of which can be left to the imagination. We are more concerned with the result of this work.

The frontage is entirely altered, being executed in Peterhead granite with the name of the Company in bold bronze characters on the fascia. The exterior of the building above the showroom windows has been thoroughly cleaned down to be in keeping with the new frontage. The tramway standard which is seen above opposite the door will, it is hoped, be removed with the impending substitution of 'buses for tramway services in the town. Two large windows now flank the entrance. These windows are "open," and through them one looks back across the spacious oak floor to the arches which separate the demonstration theatre from the showroom proper. While these arches afford a discreet impediment to the inspection from outside of those who are attending any demonstrations, they still permit consumers in the showrooms to see if a particular demonstration interests them. The main portion of the showroom—viz., immediately behind the windows, is rather in the nature of a lounge. While there are a modest number of inset fires, apart, of course, from the appliances incorporated in the window displays, this space has been left free for green leatherette armchairs and small occasional tables upon which are to be found such delectable literary gems as *Punch*. In this part of the showroom, too, is the cash-desk where consumers settle their accounts beneath a gas-illuminated clock.

The woodwork and floors are of light oak and the colour scheme is two light shades of green and cream. On the right-hand side there are the stairs leading to the basement, a model bathroom and kitchen. In these two latter sections all the appliances are "live," and while there is a geyser over the bath the taps will operate an "Ascot" multipoint water heater, which also serves other taps. The model kitchen includes in its equipment a gas-operated refrigerator, cooker, and sink heater. On the left-hand side are the inset gas fires and cash desk already mentioned.

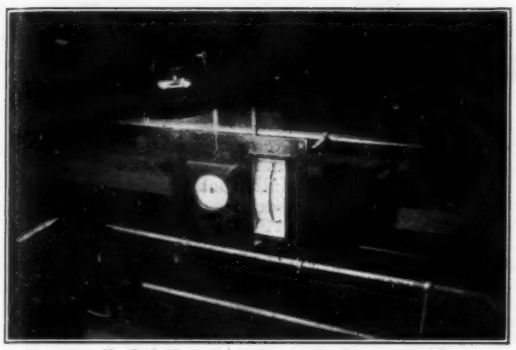
Home Service Bureau.

Work is still being carried out in the basement at the foot of the oak staircase leading down from the showrooms. Here many appliances will be displayed, and generous provision is being made for lighting and ventilation by ducts. This will result in a cheerful, airy atmosphere, completely dispelling any notion that the room is below street level. The duct ventilation, incidentally, is carried throughout the premises. The demonstration room has the same colour scheme as the showroom, and the platform where the demonstrator stands is absolutely the housewife's "dream" kitchen, with its "Easiwork" cabinets neatly built in to take advantage of every available inch of space and keeping the appurtenances of the kitchen tidily, cleanly, and always to hand. The consumers are comfortably accommodated on "Pel" chromium-plated tubular steel chairs. It is intended the demonstration theatre be

in fact a Home Service Bureau. Various women's associations, guilds, and girls' schools are communicated with, and it is hoped that a weekly series of demonstrations will be given, the menus demonstrated and the advice given to be in the nature of "request" items. The Company's demonstrator is admirably fitted for this work, for, while possessing in full a knowledge of general routine demonstration work and dietetics, she has had experience of depressed area work before going to South Wales. She will, when not out on the district in an advisory capacity as Home Service Consultant, be in the demonstration theatre to help any consumers with their particular problems.

Sugg's lighting fittings are employed in the demonstration theatre and are operated by "Webson" switches. The main showroom lighting is by Messrs. Falk, Stadelmann, & Co., Ltd. Immediately behind the windows are a number of semi-direct Everett floodlighting units which bathe the appliances displayed with a generous amount of light. The Company had the advantage of the advice of Mr. W. Gaskin, Commercial Organization Officer, B.C.G.A. The contractors were Messrs. George Parnell & Co., Ltd., Bristol and London, and the structural alterations were carried out by the local firm of Messrs. E. W. King and Son. The building has been carcassed with "Yorkshire" copper tubes and fittings by the Yorkshire Copper Works, Ltd., of Leeds and Cardiff.

Characteristics of the Ring Balance System of Pressure Measurement



Photograph taken by Gas Light of the Panel of Ring Balance Vacuum Instruments made by the Drayton Instrument Company, Ltd., and Installed in the New Glover-West Retort House at the Southend-on-Sea Works of the Gas Light and Coke Company.

Scientific development in the Gas Industry is never at a standstill, and one of the tasks of the instrument maker who provides the Industry with its "nerve system" is to see that scientific development of this "nerve system" is well abreast of the tide.

One of the most interesting of recent developments in gas-works instruments is the Ring Balance system of pressure and vacuum measurement. The difficulty of reading a manometer, especially when dealing with low pressure or draught, and the need for a permanent record, have created the necessity for the development of something better. It is, therefore, interesting to note how the simplicity and fundamental principle of the manometer have been used in order to produce an instrument which combines high accuracy with reliability and ease of reading.

With the Ring Balance system the manometer is made in the form of a ring and is balanced on knife-edge bearings, so that it is free to swing about its centre. The ring is half filled with a suitable liquid, chosen for the suitability of its specific gravity to the range required; connections are made by means of flexible rubber tubing to either side of the ring according to whether the instrument is required for pressure or vacuum measurement, or to both sides in case of differential pressure. This is shown diagrammatically in fig. 1.

It will readily be seen that if a differential pressure is applied to the ring, the filling liquid will be displaced by an amount equivalent to this pressure (fig. 2). However, although this displacement restores the pressure equilibrium in the ring the movement of liquid from one side to the other has put the ring out of its gravitational balance, and, being free to swing about its centre, the ring rotates in the opposite direction to the movement of the liquid, to restore this gravitational balance (fig. 3). It is this rotation which provides the necessary movement for the indicating or recording mechanism.

In examining the Ring Balance system, there are several points which seem to stand out as being definitely worthy of mention, and they combine to place this system of pressure and vacuum measurement in a position well in the forefront in gas-works control.

The calibration of a Ring Balance instrument depends on the counter-balance weight, and cannot therefore be upset by overloading or shock. It is independent of the quantity or specific gravity of the filling liquid, thus making the commissioning or overhaul of the instrument a matter of the greatest simplicity. Friction of moving parts may be reduced to a negligible amount by knife-edge and agate cup bearings of the type usually associated only with high-class chemical balances. Also, as the movement of the ring is rotatory, direct or single-link operation of the indicating or recording pointer obviates the necessity for magnification of the operating movement by a quadrant and pinion, thus again reducing the friction of moving parts.

The Ring Balance system lends itself particularly to the operation of large vertical edgewise indicators with scales up to 16 in. in length in some cases, and these instruments are attaining increasing popularity for gas-works use, owing to the facility with which they may be read from a considerable distance.

The Ring Balance system has been adopted extensively in gas-works on the Continent for many years, while in this country, apart from the many modern gas-works using them, the instruments are already established in the coke oven industry.

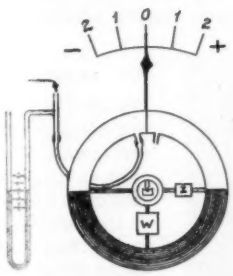


Fig. 1.—Showing the Ring-Balance System Diagrammatically. Note the Calibration Weight W and the Zero Adjusting Weight Z.

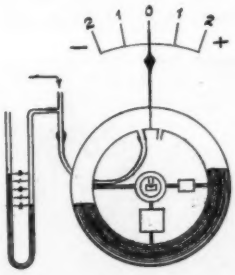


Fig. 2.—Showing the System with a Pressure Applied but with the Ring held rigid. The Displacement of the Liquid has put the Ring out of Gravitational Balance.

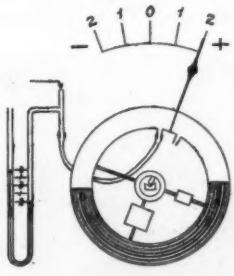


Fig. 3.—Showing the Movement of he Ring, when Released to the Point of Equilibrium.

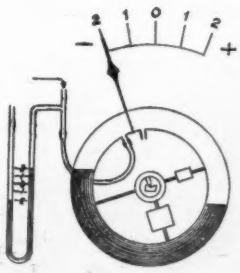


Fig. 4.—Showing the same System with a Vacuum Applied.

Behind the Scenes with

The Gas Light and Coke Company's Transport Fleet in the year 1909

Seven Million Miles a Year in the Service of the Consumer

TWO-HUNDRED-AND-EIGHTY-FOUR times round the world—a distance the significance of which the non-astronomical mind finds it well nigh impossible to grasp. Yet this is the equivalent mileage covered in a single year by the transport fleet of the Gas Light and Coke Company. More than seven million miles per annum in the service of the consumer; round about 20,000 miles a day or a journey to the moon and back every month; the permutations of such figures are almost boundless.

Such, then, is the record to-day of a department which in Edwardian days could boast but one car—and that a veteran three-cylinder Panhard which was purchased for the use of the Board of Directors. In 1909 the Company took their courage in both hands—and bought a lorry. This relic of those earlier and hazardous days of motoring—when if one reached one's destination it was largely due to the intervention of Providence, and if one didn't it was only to be expected—postulated the services of no weakling for a driver. No comfortable weather-proof cabs in those days; no soft leather cushions. In addition to wrestling with a recalcitrant engine, one was subjected to all the forces of the elements, for, as our photograph indicates, both driver's cabin and windscreen were conspicuous by their absence. The year 1929 saw the Company's transport department taking shape—with 39 cars, 138 lorries and vans, 60 horses, and a staff of 300. This really marked the birth of the department as we know it to-day.

From such embryonic beginnings, therefore, has sprung the vast organization which to-day serves the needs of a million and a half consumers by means of 168 cars, 516 lorries and vans, 93 horses, and a personnel of no fewer than 890 men.

In assessing the work of the transport fleet it must be remembered that practically the whole of the mileage covered is within the greater London area, the chief exceptions being the 23 tar tankers which operate on the roads throughout the home counties. These comprise well-lagged tanks of 1,200 gallons capacity, which are filled with hot tar to road authorities' specifications and go out on road repair work.

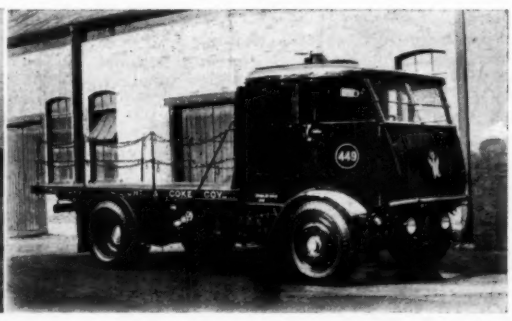
All Types of Vehicles.

The 516 lorries and vans include all shapes and sizes from little run-abouts to huge six-ton coke transporters which are utilized for bringing coke from the Beckton Works to the up-town stations. These vehicles are equipped with moving rubber belt floors which enable them to be unloaded at the rate of a ton a minute. Then there are open lorries, closed lorries, convertible lorries which can be altered from open to closed type very simply according to the particular demands of the season, compressor lorries, steam lorries, mobile showrooms, letter and parcel vans, syphon tanks, vacuum service vehicles, benzole tankers, works tractors and dumpers, horse-drawn vehicles, and many other types—all resplendent in the Company's dark green livery and bearing on their coachwork the cheery figure of Mr. Therm—symbol of the Industry's willing service.

The covered lorries and box vans travel a million and a half miles a year in the service of the stove and meter departments, carrying 30,000 pieces of apparatus each week. The open coke lorries travel nearly as far in delivering 385,000 tons of coke to consumers' premises each year, involving some 600,000 deliveries. In an undertaking whose offices, works, and depôts are scattered over an area of 546 square miles a rapid and direct means of physical communication between one centre and another is vitally necessary. Doubtless hundreds of communications arrive each day at Head Office addressed to officials who may be stationed anywhere from Staines to Beckton or from Epping to Richmond. Such communications, as well as inter-departmental letters and parcels, must be enabled to reach their destination with the least possible delay. To this end, therefore, sixteen vans are engaged exclusively on this service, travelling 231,000 miles in the year with 1,200,000 letters, 40,000 registered packages, and 240,000 miscellaneous parcels. The work of the Company's mobile showrooms is well known, and there are seven of these vehicles in service at the present time, carrying examples of the latest types of gas appliances into the Company's outposts of empire. Albeit there are more than 50 permanent showrooms in the area, 546 square miles take a lot of covering, and there must inevitably be a number of places still fairly remote from sales and service centres. Here the travelling showrooms do their bit.

Another interesting aspect of a gas undertaking's work is the collection of coins from the prepayment meters. In some undertakings a man with a satchel is sufficient; in others, perhaps, a small hand cart. But in the Gas Light and Coke Company's area the collection of 400,000,000 pennies from meters in the course of a year calls for sterner measures. Six 30-cwt. vans are deputed to convey the 4,000 tons of copper involved. For work in congested City streets these "copper" vans are mounted on special taxi chassis.

The convertible lorries, to which reference has been made, number fifty, and the accompanying photographs



The old "steamer" on the left gives an interesting sidelight on the price of coke in those early days. An example of the Company's up-to-date fleet of steam lorries for coke deliveries is illustrated on the right.

The World's Largest Public Utility

The counterpart to-day of the veteran illustrated on the left

Being a review of the scope and activities of the Gas Light and Coke Company's Transport Department.

clearly show the complete change which can be made in their appearance and applications according to the particular demands of the season—covered in the summer for appliance work and open in the winter for coke deliveries. The transport department are expert " quick-change " artists!

Then there are eight vacuum service vehicles equipped with exhausters for clearing services, which even in the areas of the best regulated gas undertakings occasionally become blocked by foreign bodies for which the technical fellows have long and difficult names. These vacuum service vehicles seem to arouse the interest of consumers; and it is a fact that on more than a few occasions harassed housewives, just about spring cleaning time, have been known to suggest that the application of the apparatus to their carpets would not be unacceptable . . . if the Company would care to. . . . When, however, it is courteously pointed out that a 28 in. vacuum would not only remove extraneous matter, but, in all probability, the carpet itself, they have generally decided not to press the matter.

The Gas Light and Coke Company make a lot of benzole, and the time of three large tankers is exclusively occupied in transporting 8,000 gallons of crude spirit every day from various gas-works to the Company's own refinery. Again, though it may at first sight seem slightly outside the province of the department, they are also responsible for the running and repair of some 450 railway waggons and tanks which carry coal, coke, and other by-products all over the country. And the department know at any given moment exactly where any one of those 450 waggons is. . . . But that is another story.

Finally, the transport department operate 32 works vehicles of different kinds which busy themselves about the Company's various works—transporting coal, coke, oxide, and so forth; among these are large tractors and lorries, both I.C.E. and steam, and nippy little dumpers for probing into awkward corners around the works yards. These vehicles handle nearly half a million tons of material annually.

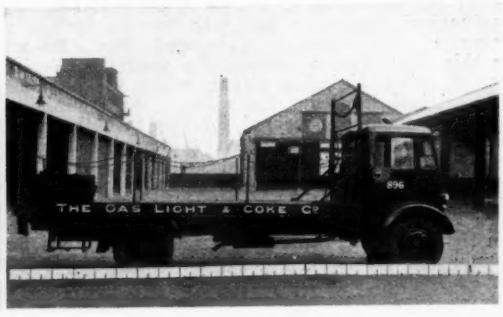
The Company maintain a number of what may be termed emergency vehicles. Among these there are three ambulances for the rapid conveyance of cases to hospital. There are two breakdown lorries for the recovery of Company's vehicles which leave the strait and narrow way and wander into gardens or areas, or attempt to disprove the law that no two objects can occupy the same place at the same time, or otherwise misbehave themselves while on duty (not that any of these contingencies are frequent occurrences, of course). Finally, a number of compressor units are fully equipped with tools and ready for instant service at any time of the day or night should a defect be reported in a main. Whenever an emergency driver goes out in response to a call another man immediately stands by to take his place in the event of another call from elsewhere. In this connection it is interesting to note that the Company's essential public service was recognized by the distribution to the transport department of a number of special passes (windscreen labels bearing the words " EMERGENCY SERVICE ") for use in the " prohibited " areas in case of necessity on Coronation Day.

A Compressor Lorry

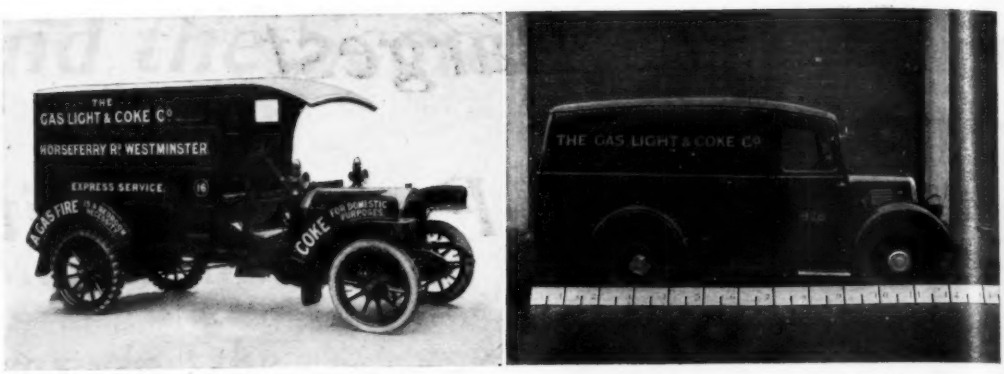
Maintenance.

It will be readily appreciated that the adequate care and maintenance of so large a fleet of vehicles forms an important part of the transport department's function, and an intricate organization is involved in this work at the chief depôt of the department at Malcolm House, Fulham. Vast garages in which each vehicle has its own allotted bay according to its individual number, repair shop, and washing bays form part of this organization, whose primary concern consists in ensuring that every vehicle begins the day's work in a clean, mechanically sound, and thoroughly roadworthy condition.

" Have you," we were once asked by a representative of the Company, " ever seen a G.L.C. vehicle starting the day



These two photographs illustrate an identical type of chassis equipped with bodies easily convertible according to the demands of the particular season into open or closed lorries.



A comparison of these two vans suggests that "express" service is a truer definition to-day than when the Company was served by the vehicle on the left—whose tyres, by the way, are worth noting.

dirty?" After mature consideration of the point we were forced to admit that we hadn't. Just a little splashed, perhaps, as a result of the prevailing conditions of the English climate—but definitely dirty, No! The same applies to the unseen but still more important mechanical parts. And behind this mere record of cleanliness lies an absorbing story of the internal organization which enables nearly 800 road vehicles to start their daily round bright, spotless, and mechanically sound—each one a shining example of the Industry's conception of its functions in the service of the community.

This conception of cleanliness applies equally to the garages themselves, which are kept spotlessly tidy with the aid of a motor sweeper, which performs the work of several men in a fraction of the time. Another point in connection with the garages which is vitally important, but not readily obvious at a casual glance, is that they are all built with their floors sloping gently towards the doors, so that in the event of fire the hand-brakes can be taken off and the vehicles run straight out with a minimum of delay.

As the lorries come in each evening the drivers park them neatly in their appropriate bay, plug in the steam heater pipe to a connection underneath the radiator, and sign off. From then on the washing brigade is in charge—consisting of 28 men who work until 3 o'clock in the morning. Zero hour is 6 p.m., when operations commence. Each vehicle is thoroughly washed three times a week. The lorry which is receiving attention is shunted to the washing bay where two washers hose it with water at a pressure of 350 lb. per sq.in., which effectively removes all traces of mud; they are followed up by two leatherers who polish up the coach-

An Example of the Company's Mobile Showroom

work, and a complete cycle of operations enables four vehicles to be dealt with at one time in the washing bay. Each vehicle is greased once a week, while it also receives a routine mechanical inspection and adjustment each week. The mechanical grease gun is operated from a compressor unit at 10,000 lb. per sq.in., which is sufficient to overcome the most stubborn of clogged pipelines or grease nipples. The average time taken to wash a vehicle is six minutes and to grease it 20 minutes, while the mechanical inspection and adjustments occupy about 25 minutes. The engine oil is changed every 3,000 miles, and in this connection a considerable saving is effected by the use of oil re-claiming plants, which yields some 80% of the original lubricant for re-use. New vehicles have a monthly one-day overhaul for the first three months of their lives and then once every four months each vehicle is sent to the Company's special repair depôt at Brentford for a two-day overhaul. All vehicles are now fitted with pneumatic tyres, for the repair of which there is a special section. About 4,000 tyres are in regular use on the road, and the average mileage obtained per tyre is round about 30,000. It may be mentioned that the care and attention which is devoted to the maintenance of the transport fleet has effected a remarkable reduction in the number of minor breakdowns. The miles run between breakdowns has risen in the past three years or so from 2,200 to 3,200, which is equivalent to less than 0·7% of running time lost—a remarkable figure. It is worth noting that the Company's drivers are not expected to be mechanics. If anything goes wrong on the road—even if it is only a puncture—the breakdown crew is summoned to put the matter right; experience has proved this to be the best policy in the long run.

Mention was made in the previous paragraph of the steam heating arrangements for the lorries. This apparatus was developed by the Gas Light and Coke Company and consists of a low-pressure gas-fired steam boiler, controlled by a pressurestat, with steam mains running through each garage. From the mains rubber tubes with bayonet type connections run to each bay, and upon plugging this fitting into the socket beneath the radiator steam bubbles slowly into the water, thus maintaining the temperature throughout the night almost at the figure at which the lorry was brought in. This makes for easy starting in the morning and enables a considerable saving in the time taken to get the vehicle on the road. The driver's nightmare of struggling with the crank-handle and a quarter of an hour wasted in warming up is banished for ever.

Steam Waggons.

The Gas Light and Coke Company are strong supporters of the steam lorry, for three very good reasons. First, from the transport operating point of view it has proved its worth in reliability, ease of handling, and economy of operation. Secondly, it is the only road transport vehicle which can be said to use entirely home-produced fuels, one of which—coke—is actually produced by the Gas Industry. Last, but not least, from the national point of view, in an emergency these waggons are the only ones for which a supply of fuel of one kind or another can be guaranteed, and with which essential services can be carried on by almost any kind of labour. In view of the disturbed state of the international situation, it is felt that the most earnest consideration should be given by any large transport operator, and particularly by those engaged in essential services such as the Gas Industry, to the building up of a nucleus of machines which are entirely independent of outside supplies.

For these reasons, the Gas Light and Coke Company have, in the last three years, put to work seventeen steam waggons of the latest light-weight type (which carry the same taxation as corresponding internal combustion engines). Thirteen more machines of this type are now on order, and the total coke consumption for this fleet will be somwhere in the neighbourhood of 1,000 tons a year, saving 65,000 gallons of benzole mixture.

The Government now seems to be more alive to the possibilities of the steam wagon, since, as a result of negotiations, the Minister of Transport has at last promised to allow an extra ton on the pay load of these machines by bringing the permissible gross laden weight up to 14 tons.

National benzole mixture is the fuel used for all the Company's internal combustion engines, involving the use of 654,000 gallons a year, while the total sum paid out in road fund licences amounts to over £22,000 annually. As the Company have more than the specified number of 250 road vehicles they are enabled to carry their own staff of examiners for driving proficiency. Two examiners are regularly employed for this purpose. The Company also pay all their drivers' licences and run their own vehicle insurance scheme.

Safety First.

There are a thousand licensed drivers on the staff, including the sales and service men and chauffeurs, and they have a particularly fine record as regards freedom of accidents, as the results of the competition held under the auspices of the Safety-First Association clearly show.

The number of drivers entering for this competition last year was 558, comprising 478 petrol vehicle men, 11 steam, and 69 horse. Of the first category 327 completed the year without an accident for which they could be considered in any way to blame (72%). Of the steam drivers, eight completed the year free from accidents, and of the horse drivers 59. A large number of drivers hold splendid records, 148 having received the Silver Medal for five years' accident-free driving, 57 the Gold Medal for ten years, and five the special bar to the Gold Medal for fifteen years. In addition there are two men now in their eighteenth year of accident-free driving and one in his seventeenth.

To show the Company's appreciation of their drivers' care, the Directors give a gratuity in addition to the Medals, no less than £564 having been presented to drivers in this way during the year. This system of awards is without doubt a big inducement to drivers to endeavour to get through the year with a clean sheet, while it is also a valuable contribution towards road safety generally, the importance of which cannot be over-emphasized at the present time.

The transport department take a great deal of trouble in providing comfortable driving conditions, all of which helps to obviate fatigue on the road. Comfortable driving cushions and all the latest motoring accessories are provided, while the general welfare of the drivers is well looked after. In addition, the men, as well as their charges, have smart uniforms, while in recognition of efficient service drivers are awarded a "Mr. Therm" badge for attachment to the front of their caps. This outward and visible sign of a "regular" driver is much sought after by the men, and provides just another incentive to maintain "safety-first" on the roads.

Horse-Drawn Vehicles.

There are still a number of shorter haulage jobs which can, it is generally agreed, be more economically carried out with horses, of which there are over 90 at work. While the very nature of the mechanically-propelled vehicles precludes their entry for *concours d'elegance* competitions, the same does not apply to the horse-drawn vehicles, which have won no fewer than 70 prizes in various competitions for neat and businesslike turnout and well-kept animals.

Though it cannot be said that the horse requires, say, regular overhaul or greasing every so many miles like his mechanical counterpart, the Company do, nevertheless, pay particular attention to their animals—even to providing them with a two months' holiday in the country every other year. The horses are taken down in floats to Abridge, where suitable marsh land adjoining the River Roding provides splendid facilities for them to enjoy a well-earned rest and forget the dust and din of London's streets.

The Company have their own veterinary surgeon and farriers, while to give some idea of the requirements of the horses it way be mentioned that some 250 tons of oats, 100 tons of straw, 120 tons of clover, together with a similar amount of hay, are provided each year.

Such then is the work of the Gas Light and Coke Company's transport department. An endeavour has been made in the foregoing notes to give an idea of the enormous amount of organization that is required in the operation of a road fleet of this magnitude and to show how constant care and supervision enables a very vital part of a gas undertaking's activities to be carried through smoothly and efficiently in the service of the consumer.

Manual of Modern Coke-Oven Practice*

Gluud's "Handbuch der Kokerei," published in two volumes in 1927 and 1928, and the English edition, "International Handbook of the By-Product Coking Industry," issued under the authorship of E. M. Myers in 1932, have been the inspiration of the present work, which constitutes the French version of a well-known and important treatise. The author of the French edition has had unique opportunities of keeping in touch with developments in coke-oven practice, and he has also had the benefit of close collaboration with Prof. Gluud, whose untimely death last year coincided with the completion of the proof sheets.

Coke-oven technique differs considerably in detail from one country to another, hence a rendering, valuable though it would have been, of the original German text into English or French with interpolated references to modern developments of a scientific and technical nature would, in large measure, have failed in its object. English and American coke-oven managers have had much cause for satisfaction with the English edition. The latest version will be as greatly appreciated in France and Belgium as were the earlier editions in those countries to which they were addressed. Its appeal will, however, not be limited to those countries, since, though primarily written with the French and Belgian viewpoint always in the foreground, the manual has been so greatly extended that it is virtually a new work. As such, it will be a useful adjunct to the earlier editions in their respective countries.

The scope of Gluud's handbook and of its foreign editions has embraced, on the one hand, the treatment of coal for the manufacture of coke, and, on the other hand, the working up of the by-products. The present volume deals only with the first of these aspects, and a second volume will be devoted to the remaining aspect. Even so, the subject matter fills at least twice as much space as did the corresponding section of the English edition, which occupied, roughly, one-half of the treatise. It will at once be apparent that we are by no means concerned with a translation. Indeed, of mere translation there is but little, though the general character of the work has been preserved and some of the tables and illustrations have been reproduced. The author has, throughout, sought to amplify the subject, and he has filled a large number of gaps.

The text is divided into a scientific section dealing with coals in general and with refractory materials and a technical section devoted to the preparation, briquetting, crushing, and blending of coal, coke-ovens of various types, battery accessories, the quenching, screening, and grading of coke, and descriptions of typical installations of coke-oven batteries erected by a number of important constructional firms. Unqualified approval can unhesitatingly be given to all the chapters, with the possible exception of the last, since it cannot be denied that, in most cases, a more recent installation of each particular form of battery could have been described had a search been made through the technical literature.

It will not be out of place to give some indication of the chief improvements which have been made in the French edition. The section dealing with the occurrence of coal has been amplified by the inclusion of useful maps of some of the more important European coalfields. Much space is devoted to coking phenomena and detailed consideration is given to the swelling properties of coal. In this connection, the Sheffield swelling test and other tests of an allied nature are described. In view of the author's close association with the Belgian coke-oven industry, it is not surprising that the work of Meurice on agglutination receives ample consideration. Recent work on the fusibility of coal ash is also presented.

The section devoted to coal cleaning and preparation is an extensive one, and in it is to be found an account of the mathematical theory underlying the various types of washing processes.

The chapter dealing with the briquetting of coal is replete with useful information, and the subject of low and medium temperature carbonization is discussed both historically and technically. Some of the more successful systems, including the Coalite process, are fully described.

A further useful feature is the inclusion of information relative to mechanical producers and their use in association with coke-oven plants.

The author is greatly to be congratulated on the manner in which he has handled his subject. The rewriting and amplification of a treatise written in a foreign language is no light task, especially when a rapidly developing industry with many ramifications is the theme. A proper sense of balance and perspective is needed. It is apparent that the author possesses this to the fullest extent. The welcome which will be extended to the treatise will be coupled with the hope that the appearance of the second volume may not be unduly delayed.

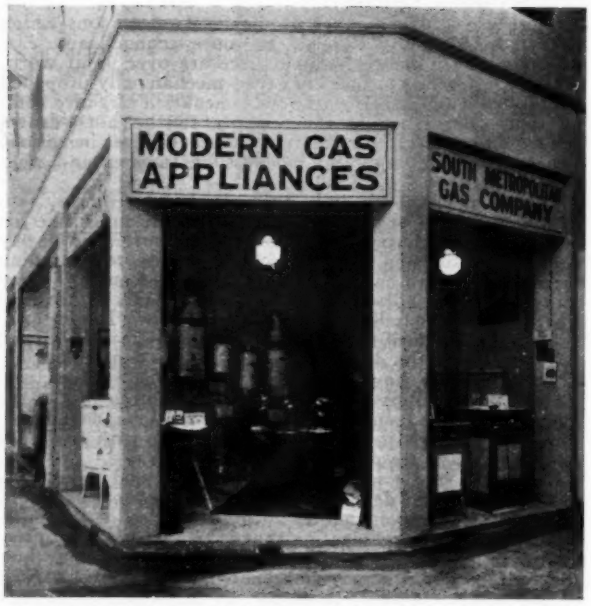
Finally, a tribute must be paid to the printers, who have produced a text which gives pleasure in the reading. The type leaves nothing to be desired, and it has been wisely varied to demarcate sub-sections and the transition from one subject to another. There are upwards of 450 illustrations, including several folding plates and pages of photo-micrographs.

* Manuel de la Cokerie Moderne, Vol. I. By M. Simonovitch. (Liege, 1937. Pp. XXIV. + 750. Price, 740 Belgian francs, postage extra. Copies obtainable from the author, 6, Square Larousse, Brussels, Belgium).

Bringing Gas into the Market Place

South Metropolitan Company's Enterprise at Brixton

The South Metropolitan Gas Company, ever on the look-out for new methods of bringing the advantages of gas more prominently before the public, have hit upon a novel scheme whereby the renting of shops in the recently completed Granville Arcade, Brixton, has enabled them to carry "GAS SERVICE" right into the heart of one of the district's most popular shopping centres — claimed to be "London's Largest Covered Market."



The Corner "Shop" where Appliances are Displayed.

It is a very peculiar fact—and one which has probably worried gas salesmen up and down the country for many years past—that, no matter how much trouble and expense one goes to in order to provide attractive and inviting showroom premises, there still remain a large proportion of gas consumers who, for reasons best known (or unknown) to themselves, just won't take advantage of them.

There is no getting away from the fact that a considerable number of consumers—not necessarily limited to any particular class—find many gas showrooms apparently so awe-inspiring that they cannot pluck up sufficient courage to enter, although they may be genuinely interested in one or another application of gas. They are, perhaps, quite literally content to "blush unseen" on the wrong side of the showroom window. Others use the showroom solely for the purpose of paying their accounts—and, even then, they scuttle across the floor to the cash desk like frightened rabbits—looking neither to right nor to left—and are equally anxious to get out again before anybody has a chance to sell them something, or, perhaps, before they themselves are tempted to buy. It is an abstruse problem which only time and psychological research will adequately solve. Not being psychologists, therefore, we make no attempt here to offer any constructive suggestions; but the matter is undoubtedly deserving of closer attention.

The fact remains that the South Metropolitan Gas Company—in common, probably, with many other undertakings—have experienced this difficulty in many parts of their area of supply. Although their showrooms are attractive, without being over-dignified or pretentious, there are many consumers who never avail themselves of the facilities thus offered. Do South London people suffer more from natural diffidence than their contemporaries elsewhere? Who can say! In any case, the Company recently decided that something must be done about it, and, a valuable opportunity presenting itself, they followed the precept of Mahomet and the Mountain and carried "GAS SERVICE" into the market place, installing it, with due humility, alongside the vendors of cabbages and patent medicines.

The Arcade.

The venue is the new Granville Arcade—claimed to be "London's Largest Covered Market"—just opened at Brixton, and not more than a few hundred yards, be it noted, from the Company's fine showrooms in the Brixton Road. The site covers an area of about an acre, on which 112 shops have been built under the one roof, divided up into numbered "avénues" reminiscent of New York City. The bright concrete construction and gay green paintwork provide a cheerful setting for the atmosphere of good humour which invariably pervades such markets, with their wandering crowds of humanity in search of bargains and the continuous cajoling of vendors extolling the virtues of their own particular lines. The magnetic influence upon the purchasing public of such places and the inherent suggestion that here everything can be obtained "just a little cheaper" has a wonderful pulling power; and it is thus only right that gas should take its place beside all the other domestic necessities so skilfully set out to tempt that same purchasing public.

Specially designed to give maximum daylight and ventilation, the Arcade was planned by Messrs. A. & V. Burr, of Gower Street, W.C. 1, Mr. E. W. Palmer, of Enfield, and Mr. Granville-Grossman, and was constructed by Messrs. E. A. Roome & Co., Ltd., of Hackney. Huge crowds attended the opening ceremony on May 6, which was performed by Mr. Carl Brisson, the well-known film star.

In the first place, it may be mentioned that the main lighting of the market is shared between gas and electricity, nineteen "Rochester" 4-light lamps providing the former's contribution to the bright illumination of the avenues which is a feature of the place after nightfall. In addition, the public lavatories are equipped with a full hot water service by means of "Ascot" multi-point heaters, which are fitted in full view on the walls so that the public can appreciate the advantages of gas for trouble-free and continuous water heating. Moreover, a large number of the shops are also equipped with gas apparatus either for the comfort of the staffs or for demonstration purposes, among the latter being a "Portway" pastry oven which is used for cooking cakes and pastries before the eyes of the public. Other gas appliances in use include four cookers, a sugar boiler, a refrigerator, three sink water heaters, and many other smaller appliances. Quite apart, therefore, from the publicity value of the Gas Company's own displays, there is a useful load among their

Mr. Carl Brisson, who opened the Arcade, attracted a huge crowd to the Company's Cookery Demonstration Section, where he was caught by the camera man.

neighbouring " shopkeepers," and throughout the market in general.

The South Metropolitan Company have two separate features of interest, one shop on a corner site being devoted to a representative display of gas appliances, while two adjacent shops on another avenue have dispensed with their party wall in order to provide for cookery demonstrations. In the former all the most popular domestic appliances are displayed with tickets prominently setting out the cash price and hire purchase terms, while in the latter regular demonstrations four times a day of simple everyday dishes attract large crowds of housewives. There are seats to accommodate about fifty persons at these demonstrations, where the lecturer is assisted by microphone and loudspeakers; but it is common for many more to collect around the shop outside. All the essential kitchen appliances are grouped together for the use of the demonstrator —cooker, sink water heater, refrigerator, &c.—exemplifying the advantages of the all-gas kitchen, while around the walls is a series of coloured posters which emphasize the many uses to which gas can be put in the home.

So much for the show itself; but the story is not complete without some proof of its value to the Company—either actual or anticipated. The irrefutable evidence of the " order book " has already led to the assumption that their enterprise will be fully justified. The Granville Arcade was opened to the public on May 6—and during the first three days no fewer than 62 definite orders had been booked, covering all types of gas apparatus from a refrigerator and several cookers and water heaters to a large number of smaller appliances. And the interesting point about these orders is that they emanate from all quarters of the Company's area of supply—indicating that the customers of such a market are by no means limited to local residents. Moreover, another feature is that, after working hours, both husband and wife visit the market and wander round together at their leisure, which is the time —as all gas salesmen know full well—when most sales can usefully be effected.

The South Metropolitan Company are to be congratulated on their enterprise in opening up a new permanent field for gas " showmanship," and we shall look forward to learning in due course, when further results are available, how the scheme is progressing after the first novelty of a new venture has worn off and the public has settled down to regard the Granville Arcade in the light of a normal shopping centre. We feel sure that, even then, the Company's efforts will continue to be well repaid.

Manchester and District Junior Gas Association

More than a hundred members of the Manchester and District Junior Gas Association visited the works at Newton Heath, Manchester, of R. & J. Dempster, Ltd , on May 5.

A group of members of the Manchester and District Junior Gas Association at the works of R. & J. Dempster, Ltd.

A thorough tour was made of all the various departments, particular interest being taken in those devoted to the construction of waterless gasholders; fitting shops, foundries, pattern stores were all inspected, as well as the plate planing shop, welding plant, and brass foundry, particular note being taken of the special floor plates in course of construction for the South Metropolitan Gas Company. Examples of the firm's static washers and their new type of valves and carriages for spiral-guided holders were seen in process of assembly, while the gasholder disc cutting machine evoked special interest.

Following the tour of inspection, the visitors repaired to the Engineers' Club, where a Paper entitled " Steaming in Horizontal Retorts " was read by Mr. A. E. Hardman (Widnes). This, together with a report of the discussion which followed, will be found on other pages.

The Association were subsequently entertained at dinner by R. & J. Dempster, Ltd.—the PRESIDENT (Mr. T. Caldwell, of Widnes) in the chair. Their hosts were represented by Messrs. J. Winson Scott, L. Walker, and R. A. Mather.

Proposing a toast to the firm for their kind hospitality, the PRESIDENT said that it had been a memorable visit, from which they would all benefit. The toast was supported by the SENIOR VICE-PRESIDENT (Mr. A. K. Collinge, of Preston) and by Mr. R. L. GREAVES (Stockport).

Responding to the toast, Mr. J. WINSON SCOTT said that it had been a pleasure to have so many members of the Manchester and District Juniors at their works. He went on to speak of the pioneer work of R. & J. Dempster, Ltd., in years gone by. In the 'eighties of the last century they had erected a carbonizing plant for the purpose of recovering by-products in which the gas produced was utilized for heating the retorts; this plant was still in operation. Subsequent developments included their plant for the recovery of by-products from blast-furnace gases, the Peebles process, the purchase of the Gadd and Mason Patents, the Delwik-Flesher water gas plant, Feld washers, hydrogen plants, and, later still, the waterless gasholder. Though they had not always backed winners, remarked Mr. Scott, they had succeeded in keeping their works fully employed despite the changing conditions of trade.

Mr. WALKER and Mr. MATHER also responded.

Steaming in Horizontal Retorts

by A. E. HARDMAN (of the Widnes Corporation Gas Department).

From a Paper read before members of the Manchester and District Junior Gas Association at a meeting held at Widnes on Wednesday, May 5.

It is hoped that this Paper on the short experience of steaming in horizontal retorts at Widnes may throw additional light on this subject, and be of some guidance to those undertakings contemplating the process.

The number of therms which may be added in the form of water gas as a diluent for the straight coal gas by the steaming of the incandescent coke in horizontal retorts at the end of distillation depends to a very large extent on the following factors:

(1) The highest quality of straight coal gas it is possible to make in the retort house without sacrificing thermal yield.
(2) The declared calorific value of the gas sold.
(3) Whether benzole is being extracted, and to what extent.
(4) That the air added for revivification *in situ* is the minimum required for this purpose.

These are factors all or some of which vary considerably for different undertakings and will therefore affect the results which may be obtained. Each undertaking must be assessed under its own existing or attainable conditions of working.

At Widnes it has been possible to dilute with 8 therms of water gas per ton of coal carbonized without apparently reaching the limit, and it has been estimated from this that the calorific value of straight coal gas as made prior to dilution with water gas must be at least 560 B.Th.U. This calorific value may possibly be increased by reducing the vacuum on the retorts, but there is danger here of losing thermal yield if carried to excess.

The declared calorific value of gas sold is 475 B.Th.U. The lower this value the greater the number of therms which may be added in the form of water gas as diluent. Benzole is being extracted to the extent of 1¾ gal. per ton of coal carbonized. This yield cannot be increased with existing plant without reverting to the use of gas oil instead of spindle oil as the washing medium, and spindle oil is found to be the more economical.

The air for revivification of oxide *in situ* and that required for further dilution down to the declared calorific value (when not steaming) is drawn in on the vacuum side of the exhauster, and as some of the oxygen is absorbed by the ammoniacal liquor in the Livesey washer and scrubbers, that required for revivification is in excess of what it would be if the air was introduced under pressure and metered at the inlet to oxide purifiers. A scheme for doing this is at present under consideration.

It was first decided to experiment with steaming in 1935. The carbonizing plant at the Widnes Gas-Works comprises 16 settings of 8 horizontal retorts, each 24 in. 20 in. D section, and 20 ft. through; settings are of the regenerative type, with built-in producers. Only the cheaper slacks are used, and consist mainly of Lancashire washed slacks with smaller quantities of Yorkshire and Derbyshire. Sizes are 1 in. downwards, the average being about ½ in. Average analyses show:

	%
Moisture	6·0
Volatile matter	30·5
Fixed carbon	57·5
Ash	6·0

Retort house governors are not employed, the exhauster directly controlling vacuum and quality. Seals in the hydraulic main are about 1½ in., and vacuum in the foul main is about 1 in. water gauge for normal working.

Steaming Arrangements.

In 1935 one block of four settings, connected to a separate tar tower, was fitted up for steaming. A Lancashire boiler formerly used in conjunction with a blue water gas plant (now dismantled) is used to provide the steam. It is situated just outside the retort house, and was very rarely used. A 2-in. steam main was run into the retort house and laid immediately below the charging stage, where it is reduced to 1½ in. and runs the entire length of the house on the charging side. It is well lagged, and trapped at suitable points; the charging side is the more sheltered, and therefore preferable from the steaming point of view.

For each setting a 1 in. supply is taken from the 1½ in. main to a superheater situated between the second row of mouthpieces on the charging side. The superheater consists of a tubular casting 2¾ in. internal diameter of "Hytemp" steel, inserted in a firebrick box built into the front wall of the setting. The 1 in. supply terminates in an open end ½ in. from the closed inner end of the superheater. Steam passes into the superheater at this point, returning to the header, which is studded to the outer end of the superheater. From this header, which is of "Hipress" steel 12 in. internal diameter x 3 in. deep, are led eight ½ in. steam supplies to the mouthpieces.

Each ½ in. supply is controlled by a bronze parallel slide link valve which provides a fullway steam passage, and is opened or closed by a quarter-turn of the handle. A ½ in. pipe taken from the bottom of the header is connected to a steam trap below the charging stage. Bronze nipples drilled ⅛ diameter are inserted into the supply pipes at the connections to the mouthpieces. Provision for cleaning and removal of the nipples is made by use of a plugged ½ in. tee.

Anti-Dip Valves.

It is necessary to install anti-dip valves or some other means of closing the ascension pipe on the side at which steam is to be admitted to ensure the steam passing through the retort and the gases leaving by the further ascension pipe. The Gas Light and Coke Company's type of Anti-dip Valve, manufactured by Messrs. Drakes, Ltd. (see fig. 3) were installed on the charging side of the four settings to be steamed. This type of anti-dip consists of a movable dip pipe having a travel of 4 in. On the upper end of the dip pipe is cast a sleeve which works in an annular cup, providing a seal to prevent short circuiting of steam when dip pipe is lowered and of gas when it is raised. Operation of the anti-dip valves is by levers and rods, the latter being accessible from the charging stage.

Initial Steaming on Four Settings.

Steaming commenced in December, 1935, at which time twelve beds in all were working. Three shifts of stokers were employed, and charges of 15 cwt. were carbonized for 16 hours, and with combustion chamber temperature of 1,400° C. were burnt off in about 14 hours, giving a retort temperature of about 1,050° C. At this time, anti-dip pipes were lowered, and the steam supply valves turned on. The steam pressure was 60 lb. per sq.in. (gauge), and the seal in the hydraulic main on the charging side (steaming end) would be about 5½ in. Steaming was tried for the last two hours of the carbonizing period.

A steam meter had not been installed, the flow of steam being considered too small for accurate registration, but some idea of the amount of steam passing ⅛ in. orifice at 60 lb. per sq.in. was obtained by calibration. This amounted to about 50 lb. per hour, making the steam input 100 lb., or 5% to 6% by weight of the coal charged.

It was not possible to meter the gas from four steaming settings separately from the remainder of the gas stream, and it was considered that gas analyses would indicate the trend of the experiment. Accordingly, numerous snap samples were taken from ascension pipes at the discharging side.

Typical Analyses of Gas taken from Ascension Pipes at Discharging Side.

[15 Cwt. Charges—Carbonized for 16 Hours—Steamed for last 2 Hours.]

% by Volume.	After 14 Hours Carbonizing (Before Steaming).	After 15 Hours Carbonizing and One Hour Steaming.	After 16 Hours Carbonizing and Two Hours Steaming.
	%	%	%
Carbon dioxide	3·2	7·5	9·2
Unsaturated hydrocarbons	0·2	0·1	*Nil*
Oxygen	0·5	0·5	0·5
Carbon monoxide	16·5	29·4	26·7
Methane	6·2	1·2	0·8
Hydrogen	52·6	54·7	54·5
Nitrogen	20·8	6·6	8·3
Calorific value, B.Th.U gross	287	283	268

When fully filled throughout its effective carbonizing

length, one retort will hold 22 cwt., so that with charges of 15 cwt. the retort is only 68% full.

The anti-dip valve seal was effective in preventing any steam passing up the ascension pipe at the charging end of the retort, this remaining quite cool at the top. Snap analyses of the gas from a retort revealed that the percentage of water gas was not sufficiently high and that the percentage of steam decomposition was poor. The steam was having a very perceptible cooling effect on the coke for two or three feet from the steaming end of the charge. Trouble also arose through the thickening of the tar to such an extent that great difficulty was experienced in running it off from the tar tower at the appointed times. All the beds were working under identically similar conditions of temperature of combustion chamber, percentage full of retorts, and carbonizing period, which indicated that the thickening of the tar was entirely attributable to steaming the charges, as trouble was not experienced with beds not steamed. To keep the tar sufficiently fluid to flow away, the charges of beds fitted up for steaming could only be steamed on alternate days; this meant at the time that only two beds out of a total of twelve working were being steamed. Under these conditions it was impossible to measure with any degree of accuracy the increased thermal gaseous yield due to steaming.

Comparative Tars.

Test.	Sample from Non-Steaming Beds.	Sample from Steaming Beds.
Specific gravity	1·210	1·248
Water content	2·4%	3·3%
°C.	% by volume	% by volume
0–200	1·8	1·0
200–240	9·6	7·0
240–280	8·5	6·2
280–320	4·4	3·0
320–360	10·2	10·1
Pitch	65·5	72·7
Free carbon	19·1% by weight	30·3% by weight

The effect of steaming with the large free space above the charge, and the longer travel of the gas as a consequence of using only one ascension pipe, considerably increased the pitch and free carbon in the tar.

Liquor Strength.

Some idea of dilution of the liquor by undecomposed steam was obtained by taking samples from the hydraulic mains on both charging and discharging sides simultaneously, during the steaming period:

—	°Tw.	Free Ammonia.	Fixed Ammonia.	Total Ammonia.
		%	%	%
Liquor from charging side	3	0·19	1·05	1·24
Liquor from discharging side	2	0·14	0·77	0·91

Having regard to the thickened tar and poor quality of blue water gas made with a light charge, it was decided to experiment with a filled retort.

Experiment with a Filled Retort.

A Drakes charging machine was used, and being of the projector type is capable of filling the retorts. The stokers on the discharging side hold a "stopper" placed in the retort against which the charge is thrown by an impeller revolving at a high speed.

Several cold retorts were filled throughout the carbonizing length, and the charges withdrawn and weighed. The average weight per charge was 22 cwt. One steaming retort was charged in this way for many days, and the charges were carbonized for a period of 24 hours. Distillation appeared to be complete after 21 hours, the retort temperature then being 1,100° C., with a combustion chamber temperature of 1,400° C. This allowed a period of three hours available for steaming. After three hours' steaming, the cooling effect of the steam had blackened the charge for a distance of 2 to 3 ft. The remainder of the retort showed no tendency to cool off.

It appeared likely, therefore, that three hours would be the longest period in which to steam effectively. Despite the filled retort, no evidence was to be found of steam breaking through the seal in the hydraulic main on the charging side. During the steaming period, the ascension pipe on the charging side remained cold, indicating that all the steam was passing through the retort. The input of steam was 6·1% of weight of coal as charged, being admitted through $\frac{1}{8}$ in. orifice at 60 lb. per sq.in. (gauge).

The following analyses show the composition of the gas immediately prior to steaming, and during the steaming period:

Typical Analyses of Gas from Retort Fully Charged with 22 Cwt. and Carbonized for 24 Hours.

% by Volume.	After 21 Hrs. Carbonizing and Immediately Prior to Steaming.	After 22 Hrs. Carbonizing and One Hour After Steaming.	After 23 Hrs Carbonizing and Two Hours After Steaming.	After 24 Hrs. Carbonizing and Three Hours After Steaming.
Carbon dioxide	1·7	3·4	5·8	8·6
Unsaturated hydrocarbons	0·1	0·4	0·2	0·2
Oxygen	0·5	0·4	1·0	0·2
Carbon monoxide	16·2	40·1	38·4	27·4
Methane	7·6	1·8	1·6	1·3
Hydrogen	50·0	50·7	49·3	58·8
Nitrogen	23·9	3·2	3·7	3·5
Calorific value, B.Th.U.	290	318	301	293

It will be noted that the water gas reaction is much more pronounced than when steaming the lighter charges. The carbon monoxide had increased to 40%, accompanied by a slight increase in carbon dioxide, and a big decrease in nitrogen.

Slight pressure conditions in the retort consequent upon steaming helps to exclude, and therefore reduces the percentage of, inert gases. The slight increase in unsaturated hydrocarbons is probably due to the shielding or blanketing effect of the steam in preventing overcracking. Calorific value is maintained up to the time of discharge.

Alteration of Schedule.

It was now decided to charge fully the retorts of all working beds and revert to two 8-hour shifts with 22 cwt. charges and a carbonizing period of 24 hours. Four retorts of each bed were charged at approximately 2-hour intervals from 8 a.m. to 4 p.m., and the other four retorts of the bed from 8 p.m. to 4 a.m. This enabled the number of stokers to be reduced by three, effecting a direct saving of approximately £500.

It was decided to try a month's working on this system without steaming, in order to obtain correct data for comparison purposes. The make of gas for this month was 13,200 cu.ft. per ton of average calorific value 476·2 B.Th.U. per cu.ft., equivalent to 62·86 therms per ton. This was almost identical with the figure for the year ended March 31, 1936, obtained when working with three shifts.

The coal throughout per bed per diem is reduced from 9·0 tons to 8·8 tons. The tar had thinned considerably, and ran more easily at tar towers and condensers.

It is interesting to compare the gas leaving the retort house and the town gas at this period:

Typical Analyses of Gas as it Left Retort House, and as Supplied to the Town, with 22 Cwt. Charges Carbonized for 24 Hours and no Steaming.

% by Volume.	Gas Leaving Retort House.	Town Gas.
Carbon dioxide	2·5	2·3
Unsaturated hydrocarbons	3·0	2·7
Oxygen	0·5	1·3
Carbon monoxide	9·7	9·3
Methane	28·5	25·9
Hydrogen	42·6	39·5
Nitrogen	13·2	19·0
Calorific value, B.Th U.	522	475

Tar at the condensers had a specific gravity of 1·110 and had no tendency to hold up despite cold weather, as had previously obtained with the lighter charges.

The coke made was denser and of better formation.

Modification of Steaming Arrangements.

The superheater permits of easy alteration; this is with a view of obtaining ultimately the most desirable degree of superheat. As originally fitted in the first four beds for steaming, little if any superheat was obtained, but the steam was perfectly dry, and condensation did not occur upon contact of steam with the mouthpieces. It is considered that the higher the degree of superheat the better, as the cooling effect on the charge would be less and the percentage decomposition of the steam improved.

During the experiment with the isolated retort the CO_2 content had not been unduly high, indicating that the rate of steam admission might be increased with advantage. It was accordingly decided to try slightly larger orifices.

Calibration tests showed that a $\frac{1}{8}$-in. diameter orifice passed 50 lb. per hr. at a pressure of 60 lb./sq.in and a $\frac{5}{16}$-in. diameter 100 lb. per hour with 22 cwt. charges. The steam used during three hours would be approximately

6% and 12% by weight of coal charge respectively. It was decided to fit orifices of $\frac{5}{32}$-in. diameter.

Results Obtained with 22 Cwt. Charges Carbonized for 24 Hours, and 52% of Total Number of Charges Steamed for Last Three Hours. Four Beds Fitted with $\frac{1}{8}$ In. Dia., and Four with $\frac{5}{32}$ In. Dia. Orifices.

By December, 1936, eight steaming beds were working out of a total of thirteen, and it was decided to compare the results obtained for the three months ended March 31, 1937, with the one month working under similar conditions, but without steaming.

The number of charges steamed during the period of three months ended March 31, 1937, was 4,280 out of a total of 8,236 retorts charged, which was equivalent to 52%. The make of gas per ton of coal had increased from 13,200 cu.ft. to 13,921 cu.ft., and the therms per ton from 62·86 to 66·29, an increase in the gaseous yield of 3·43 therms. This was equivalent to an increase of 6·6 therms per ton if all charges had been steamed.

The carbon monoxide content of the gas supplied increased from 9·3% to 15%, and the total inerts were decreased from 22% to 12%. The tar did not show any tendency to thicken, the free carbon and pitch being hardly affected when steaming with the full charges.

Effect on Benzole Quality.

The specific gravity of the crude benzole was reduced from 0·882 to 0·862, and the retort test showed a reduction in quality from 82% to 75% at 120° C. The yield of benzole remained unaltered at $1\frac{3}{4}$ gallons per ton.

Since the benzole vapours have been distilled from the charge before steaming begins, the reduction in gravity and quality is apparently due to the heavier charges, the benzole being lost from the gas to the tar.

Since March 31, 1937, the proportion of steamed charges has increased, as a consequence of some of the non-steaming beds being shut down. For the two weeks ended April 14, 1937, the proportion of steamed charges was just over 73%. The make increased to 14,463 cu.ft. per ton of calorific value 476 B.Th.U., showing an actual thermal increase over non-steaming results of 5·98 therms per ton, equivalent to an increase of 8·14 therms per ton had all charges been steamed.

The following is an average analysis of the town gas supplied during the fortnight above referred to (*i.e.*, the period when dilution with water gas was at its greatest):

	% by Volume.
Carbon dioxide	3·5
Unsaturated hydrocarbons	2·2
Oxygen	0·3
Carbon monoxide	15·8
Methane	22·3
Hydrogen	48·1
Nitrogen	7·8
Calorific value, B.Th.U.	475

Effect of Full Retort Charges on Quality of Tar.

As will be expected, the tar is low in specific gravity, which is 1·14, the free carbon is 7·8%, and the pitch 40% by weight. When working with 15 cwt. charges carbonized for 16 hours and without steaming, the specific gravity of the tar was 1·185 and had a high free carbon and pitch content.

The total ammonia content of the final liquor in the storage wells has been reduced from 1·8% to 1·6%. The ultimate reduction will be greater still, as there were large stocks of liquor prior to steaming, and steaming is not being carried out to fullest extent.

Steam Decomposition.

The total steam supplied to the retorts was approximately 60 lb. per hour, or 164 lb. per ton of coal carbonized. Efficiency of steam decomposition at the highest is estimated to be 38%. It should be possible to increase this by increasing the degree of superheat of steam.

Working on the former system without steaming, retorts required scurfing every eight weeks. It appears that with the present system of working with full retorts and steaming, scurfing may be deferred for an indefinitely long period. There is a consequent saving of coke in this direction.

Economic Considerations.

There is obviously a limit to the extent to which dilution by steaming may be effected, and consequently to which the thermal gaseous yield per ton of coal carbonized may be increased. This depends upon the factors stated at the commencement of this Paper.

At Widnes, results already obtained indicate that, with all beds steaming, an increase of 8 therms will be easily realized. On this assumption the Author estimates the cost of steaming horizontal retorts, comparison being made with the actual figures obtained for the year ended March, 1936, when the retorts were not steamed.

The additional quantity of coke and breeze which would be consumed to produce the increased thermal gaseous yield of 8 therms is estimated to be 1 cwt. per ton of coal carbonized, made up as follows:

	Lb. per Ton of Coal Carbonized
Coke consumed in water gas reaction within the retort	51
Coke consumed on producer	33
Breeze burned on boiler to produce steam	28
	112

That required for the water gas reaction is calculated from the chemical equation. That to the producer is estimated from the consideration that when not steaming the normal carbonizing capacity of a retort is 1 cwt. per hour, whereas when steaming under the present system 22 cwt. are carbonized in 24 hours. The rate of carbonization is reduced by one-eleventh, and this same proportion has been added to the coke normally consumed per ton of coal carbonized.

The breeze to produce the steam is calculated upon an evaporation of 5 lb. of steam per lb. of breeze, the total quantity of steam required being estimated on an assumed 40% decomposition.

The result is a slight estimated loss, consequent upon what would have been the effect of maximum steaming for the year ended March, 1936. While the estimate may not be strictly accurate, it indicates that there would not have been any appreciable influence on the financial result for the year cited.

The determining factor as to whether steaming will be of financial benefit or otherwise is the net cost of coal (*i.e.*, cost of coal less net revenue from residuals). At Widnes, this figure is particularly low. The next most influential factor is the quantity of coke and breeze consumed to produce the increased thermal gaseous yield per ton of coal carbonized. Where steam from waste heat is available, there will be appreciable saving. It is also probable that the proportion of coke used on the producer can be reduced by superheating the steam to a high degree, and increasing the rate of steaming by using larger orifices—say, $\frac{3}{16}$ in. diameter.

Where anti-dip valves are already fitted there will be a saving in capital charges.

In some instances steaming may be of distinct financial benefit. In most cases it will at least give flexibility of control adaptable to the fluctuating prices obtainable for residual products, and additional stand-by capacity. Its merits must, however, be considered as applied to each particular Undertaking.

Discussion

The PRESIDENT (Mr. T. Caldwell, of Widnes), in opening the discussion, said that at Widnes they were somewhat disappointed with the financial results, but experiments were being continued. The main object of the experiments was to show an increased profit with a view to reducing the price of gas. The reports that had been received on the subject were very encouraging. There had been some talk of closing down the works at Staines, but after steaming the retorts, it was decided to keep them in operation. The maximum thermal yield was obtained by a greater rate of carbonization—*i.e.*, to carbonize 8 cwt. in eight hours rather than 22 cwt. in 24 hours. At Widnes they were handicapped by the size of the retorts. It was necessary to put in good steam fittings, the cost of which was approximately £100 per bed, the fittings being £80, with £20 for labour. After various experiments, an increase of 6·6% therms per ton of coal carbonized was obtained and a maximum of 8 therms per ton in the form of water gas. In the balance-sheet no account had been taken of the saving by reduced scurfing, nor had the increased value of the tar been taken into consideration, since it was sold by a fixed gallonage of 200 gallons to the ton and not on an analysis basis.

Mr. J. ALBINSON (Manchester) was of the opinion that the position was reduced to the price of residuals, particularly the price of coke. If the price of coke to-day were the same as it was, say, six years ago, then there would not be an adverse balance. He felt sure that the figure of 33 lb. of coke consumed in the producer per ton of coal carbonized could be reduced. It was very gratifying to see the use of new alloys for superheating. The Gas Industry was not taking advantage of the advance in metallurgy in connection with heat-resisting

steels. He did not think it was necessary to use superheated steam. The Paper stated that 28 lb. of breeze were used per ton of coal carbonized to produce steam. He thought exhaust steam could be used for that purpose.

In reply, Mr. HARDMAN stated that the quantity of coke used was dependent upon the size of the retort and the advisability of working 24 hours. All the investigators on steaming in horizontals were agreed that superheated steam was better. There was no waste steam available at Widnes.

Mr. R. L. GREAVES (Stockport) pointed out that it was very difficult to make comparisons of thermal yields, as even with the same plant the conditions were constantly varying. The problem resolved itself into which was the best method of dilution. There was steaming, benzole extraction, and admitting air on revivification *in situ*. Looking at the balance-sheet he agreed with Mr. Albinson that the price of residuals was one of the most important factors. There was also much to be said for carbonizing more coal and keeping more men employed. With regard to waste-heat boilers, was it quite sound to suggest that steam costs could be cut down? If a waste-heat boiler was a practical proposition, then the economy on steam was a saving which could and should be made in any case.

Mr. W. HODKINSON said that the efficiency of decomposition at 38% was extremely low. The Fuel Research Board obtained up to 70%. He asked the Author what the effect was on the coke. The domestic market demanded a clean-looking coke; a hard-looking coke was turned down by the housewife. There was also the problem of the increased yield of liquor. This applied particularly to the small undertakings which already had difficulty in disposing of their production. With regard to the Author's view that steaming increased the flexibility of the plant, did he take the view that they should steam to-day and extract benzole to-morrow? Many undertakings sold gas of a constant calorific value, but did not trouble about the gas being of a constant composition; no regard was paid to the specific gravity of the gas. There were other methods of dilution, such as installing outside producers, or taking producer gas from the settings, which gave automatic control, allowed a margin for benzole washing, giving a gas of a constant composition.

Mr. HARDMAN said that the steam was not metered, and, for obvious reasons, the experiments could not be carried out with the same exactitude as those carried out by the Fuel Board. A report had been received from Staines stating that the coke was slightly more reactive as a result of steaming, which was an advantage from a domestic point of view; the coke was also improved by reason of a bigger charge. By flexibility of the plant, it did not mean steaming to-day and benzole washing to-morrow, but it did mean that steaming or benzole washing could be carried out for, say, twelve months, according to the state of the residual market. At Widnes a slight profit was made on sulphate, and the increased quantity of liquor had not occasioned any difficulty.

Mr. T. V. BLAKE (Blackpool) enquired if the object of the experiments was to obtain a flexibility of working—*i.e.*, to obtain an extra 8 therms per ton according to season. Were they using their benzole plant to the best advantage? At Blackpool by increasing the rate of oil circulation they could extract far more benzole than they could afford. He would also like to know if they had experienced any reduction in the plant operated. If less plant was required by steaming then there was a saving in capital cost.

Mr. HARDMAN stated that the object of the experiment was not to increase flexibility, but primarily to increase profits so as to reduce the price of gas. The profitable way at present was to stop steaming and extract benzole, but with the plant they could not get more than 2½ gallons, using gas oil. Sludging troubles occurred, and spindle oil was tried, resulting in a slightly greater increase in profit.

Mr. H. GOODIER (Runcorn) said that he had carried out experiments in steaming in 1916, when quantity of gas was more important than quality and he increased his make by 1,500 cu.ft. per ton of coal carbonized. He congratulated Widnes on the results they had obtained. He thought that there ought to be a charge in the balance-sheet for the added cost of volatilizing the extra water in the sulphate plant. On the other hand, there was a reduced quantity of coke available for sale, and this should assist in increased prices being obtained.

Mr. J. GRAHAM (Lancaster) proposed a vote of thanks and said that the Association were indebted to Mr. Hardman for bringing the results of the experiments so clearly before the members of the Association.

Mr. H. H. THOMAS (Liverpool) seconded the vote of thanks which was heartily accorded.

Safety Principles in Mines*

This book could not possibly have come at a more opportune time or be of more topical interest than at present, when the highly important Royal Commission of Safety in Coal Mines is in session. Speaking at this Royal Commission recently, Mr. J. Ritson, General President of the National Federation of Colliery Officials, said on behalf of that Federation, "We desire to stress the importance of the training of boys in safety principles before they enter the mines." This book is directed to that very purpose. It is a thoroughly practical guide to the young man entering the mining industry—just at the time he most needs help.

* Oxford; Basil Blackwell, 49, Broad Street; price, 1s. 6d.

Gas Undertakings' Results

Primitiva Holdings, Ltd.

The report of the Directors of Primitiva Holdings, Ltd., for the year ended April 30, 1937, states the net profit for the year amounts to £78,646, to which has to be added the balance brought forward from the last account, £119,831, making a total of £198,476. From this sum has been deducted: Dividend (less income-tax) on the 6% redeemable cumulative preference stock for the year ended Dec. 31, 1936, amounting to £11,191, and allocation to general reserve, £10,000, leaving £177,285. The Directors recommend that sum should be appropriated as follows: Dividend on the ordinary stock of the Company at the rate of 3% (less income-tax), absorbing £53,442, leaving a balance of £123,843, which the Directors recommend should be carried forward, subject to accrued interest and sinking fund on the preference stock, from Jan. 1 to April 30, 1937, amounting to £4,201.

South Midland Gas Corporation.

The report of the Directors of the South Midland Gas Corporation, Ltd., for the year ended March 31, 1937, states the profit available to be dealt with by the Company in General Meeting is as follows: Balance brought forward from last year, £284, add profit for the year, after charging income-tax and all other expenses, £4,632, making a total available for appropriation of £4,916. From this has been appropriated the dividends paid on the preference shares for the year to March 31, 1937, £1,411, the interim dividend paid on the ordinary shares for the six months to Sept. 30, 1936, £863—£2,274, leaving a balance of £2,642, which it is recommended be appropriated as follows: Final dividend on the ordinary shares at the rate of 5½% per annum for the half-year ended March 31, 1937, £863; reserve for premium on redemption of preference shares, £20; in writing off the balance of preliminary expenses and expenses of increasing capital, £591; in writing down the buildings and plant at Eynsham Works, £500—£1,973, leaving to be carried forward to next account £669. The final dividend on the ordinary shares now recommended together with the interim dividend already paid makes a total dividend for the year of 5½%.

South-Western Gas and Water Corporation.

The report of the Directors of the South-Western Gas and Water Corporation for the year ended March 31, 1937, states the net revenue for the year, after providing for income-tax, interest, and other expenses, amounted to £21,719, to which must be added the amount brought forward from last year, £242, making £21,961. Out of this sum the following dividends have been paid or provided for: On 4½% cumulative preference shares to March 31, 1937 (less income-tax), £5,678, and interim dividend of 2% (less income-tax) on the ordinary shares, £6,525—£12,202, leaving a net amount available for appropriation of £9,759. The Directors recommend payment of a final dividend on the ordinary shares of 3% (making a total of 5%) for the year to March 31, 1937, less income-tax, £9,627, leaving to be carried forward £132. A reserve fund has been created and credited with the sum of £1,925, being profit realized on the sale of investments during the year.

Trade Note

Progas Company, Ltd.

Mr. T. Coe, of Halifax, informs us that he has now ceased to represent the Progas Company with which he has been associated for the past few years in the Cheshire, Lancashire, and Yorkshire areas.

Flues for Instantaneous Gas Water Heaters

by
LEOPOLD FRIEDMAN
(Chief Engineer and Manager Technical Department, Ascot Gas Water Heaters, Ltd.)

From a Paper read before members of the Midland Junior Gas Association at a meeting held on Thursday, April 1—Mr. F. A. JENKINS (Leamington), the President, in the chair.

May I quote Mr. Stephen Lacey*: "One found a remarkable ignorance of the principles which should govern the design of flue equipment among people who are responsible for installing flues. The speculative builder was probably the chief offender, but, if he dared say so, architects were not beyond reproach. Builders were often to be found in this twentieth century attempting to ventilate gas fires by horizontal pipes through external walls, and mis-using specially designed flue blocks by leading them to air bricks built in walls under the eaves of the roof. Some people appeared to think that a hole anywhere through a wall ought to be sufficient to ventilate a gas appliance."

There is a curious reluctance among builders to consider seriously the problem of flues for gas water heaters. In my opinion it is imperative to make certain that efficient flue installations are provided for heaters consuming more than 30 or 40 cu.ft. of gas per hour, except in the case of instantaneous heaters which operate intermittently when the rating can safely be raised to 75 cu.ft. per hour.

In this connection I should like to tell you of the experience of one of the Service Engineers in my Company. The man was asked to inspect a gas water heater installation where the complaint was that of "fumes." On his arrival he found that the flue consisted of a 6 ft. horizontal length of pipe connected to a "Ventile" which was placed in such a position on the wall that its effect was entirely nullified. Over this ventile was mounted a wooden box enclosing it on three sides, the bottom being left open. On enquiring as to the purpose of this box, he was informed by the builder that he had had complaints of back draught and had thought of this arrangement which, in his opinion, had the added advantage of preventing the cold wind from blowing down the flue and cooling the water in the heat exchanger.

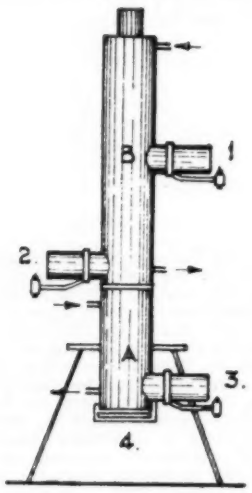


Fig. 1.

The question of flues is such that it is not possible to give any hard and fast rules as to what should be done, as each particular case requires individual attention, but it is possible to give some indication of what should be avoided.

When studying this subject we must bear in mind that the flue conditions are governed not only by the volume of the products of combustion, the temperature differences, and the height of the flue, but also by such a variable as the weather, this depending as it does on humidity, air temperature, velocity, and direction of the wind; all equally uncertain facts.

There is a fundamental difference between the flue pipe required for a solid fuel-fired installation and a gas appliance. A solid fuel chimney must produce pull, assist in starting and maintaining combustion, lead away the products thereof, and also ventilate the room; whereas a gas appliance flue is primarily required only to lead away the products of combustion, although in some cases also to ventilate the room. The conditions which govern the provision of the necessary pull are much the same in both cases.

The following experiments* relate to solid fuel fire installations, but the general deductions are applicable to gas-fired installations. For these experiments a small scale experimental chimney was used as in fig. 1. This consists of a central chimney surrounded by two water jackets, A and B, with three or more inlets or connecting flues. The jackets can be filled with water at any desired temperature; thus the central chimney is temperature-controlled and can represent flues of different materials by either causing the chimney to add to or take away quantities of heat from the gases in that chimney as required.

The connecting flue-inlets 1, 2, and 3 may be capped off as required. At the lowest point of the chimney an adjustable opening, 4, is provided and the effect of restricting the outlet discovered by using the terminals illustrated in fig. 2.

These experiments will not be described, but the deductions are given here:

(1) To produce "pull" for the initial combustion stage, the air inside the chimney must be warmer than that outside. From this is seen the need for "two stage ignition"† to avoid momentary incomplete combustion due to the momentary absence of pull. Although the initial pull may be weak or non-existent, heat entering the chimney (in the latter case the combustion chamber) will start this pull, and it will increase with the temperature. The higher the chimney and the greater the temperature difference, the greater is the pull up to a certain maximum.‡

(2) If for some reason the temperature of the chimney is lower than that of the outside air—for instance, the effect of the sun shining on the roof and the quick warming of the air above the roof, or again, a chimney that has not been in use for some time (especially in damp buildings), back draught is liable to occur.

(3) When the upper part of the chimney is cold there is an air current downwards which carries flames and products of combustion back to the nearest air supply. Thermal-static conditions are illustrated best in practice by a chimney that has remained unused for a lengthy period, and until the material of that chimney has been warmed slightly above atmospheric temperature there is neither back draught nor pull.

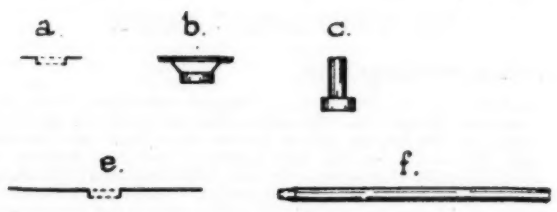


Fig. 2.

(4) The use of common flues is not advisable, for, even under conditions of "pull," the distribution of this is most

* Discussion on "Combustion, Wind, and Flue Equipment," by C. A. Masterman, 1930.

* Professor Dr. H Meidinger.

† "Some Practical Aspects of Instantaneous Water Heating by Gas," by Leopold Friedman, p. 12.

‡ "Combustion, Wind, and Flue Equipment," by C. A. Masterman.

unsatisfactory. The more the size of the chimney is reduced in diameter by means of extending it with flue piping of a smaller diameter or by the addition of chimney pots or similar fittings, the more pronounced becomes this effect.

(5) It is essential that on any flue installation the outlet area of the terminal shall be of ample size to deal with all the products that may be required to pass from it—that is, its outlet area should be no less than the area of the flue. With common flues we cannot assume that " pull " is present at all flue inlets just because it may be present on one or two.

(6) With common flues it is impossible to guarantee that " pull " will be produced by a slightly warm chimney, and gases entering through one flue inlet are quite liable to pass out into the room by another flue inlet irrespective of whether the travel is in an upward or downward direction.

(7) It appears that under certain conditions it is quite possible for all products entering the main flue to be discharged at one common point, and this point will not be the correct outlet. This is a serious matter in common flue installations.

The question of common flues for use with appliances has not been sufficiently studied, and what is known does not justify their use with gas appliances. It should be noted, however, that the effect of down draught on appliances on some floors due to certain conditions set up by the flue openings of other floors can be counteracted by British Patent No. 452315.* Objections depending on the gas explosions in brick flues can be disregarded, as experiments conclusively prove.†

(8) There are certain adverse pressure conditions which cannot possibly be cured by natural draught, and the only method is to place the outlet of the flue outside this region. This can be compared with a wireless aerial picking up interferences from an electric motor, and the only method of overcoming this is to place the aerial outside the sphere of interference.

(9) Temporary conditions of back draught or pull can easily be created by altering the pressure conditions at either end of the flue—that is, opening windows, doors, &c., which will temporarily create a " suction " or " pull."

(10) The stronger the draught at the bottom of a common flue the poorer the draught at the higher flue-inlets, this effect being increased with decrease in the size of the flue. Should a large volume of air be passing in at the bottom flue inlet this will create a slight pressure towards the top of the chimney, possibly causing back draught above.

Effect of Wind.

Now let us examine the effect of wind blowing in various directions on a flue outlet without any terminal. With the wind blowing at right angles to the chimney outlet, it is quite probable that an effect as in fig. 3 would be obtained—that is, unless there is a strong " pull " in this chimney the effect of the wind will be to cause down-blow.

Fig. 3.

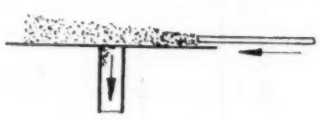


Fig. 4.

Let us now place on top of the flue outlet the small plate, as illustrated in fig. 2e, this ensuring that the wind travels in exactly horizontal direction, and here, although the tendency to down-blow is somewhat reduced (fig. 4), there is, however, a slight blow in this direction, and we cannot claim to have increased the draught of this flue. In fig. 5 the wind is deflected so that it blows at 45° to the vertically upwards direction, and it can be seen that we have in this manner slightly assisted the flue in its duties, for the stream of air has a slight " suction " effect on this flue.

Fig. 5.

Fig. 6.

Fig. 7.

If we change the position of our blow pipe until the air stream impinges on the ascending flue, as in fig. 6, we may cause the air stream to deflect in the upward and downward direction, thus creating a slightly lower pressure at the flue outlet. Should we put the flue cap, illustrated in fig. 2a, we will alter the effect to that shown in fig. 7, thus having a negligible effect on the flue.

The more practical application is to be found in fig. 8, where a continuous stream of wind impinges on the whole length of the flue and the resultant wind-arch formed over the top of the flue pipe is really the compound effect of the conditions illustrated in fig. 3 and fig. 6. We thus obtain a " pull " in the flue. Should we now place the terminal " *a*," fig. 2, on top of the flue pipe and leave the conditions as before, this useful " arch-effect " is destroyed (fig. 9) and down-blow produced.

Fig. 8.

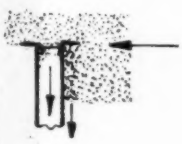


Fig. 9.

Fig. 10.

Bearing these previous experiments in mind, let us refer to fig. 10, which shows us the highest point at which we should place a rim around the top of the flue, not less than 10 in. lower than the point of termination, this giving us a high arch over the top of the flue.

From fig. 8 we see that, should the wind be blowing from an angle of, say, 30° above the horizontal, this being caused by obstructions or near-by buildings, then the construction of our present flue is unsatisfactory, and we must add a deflecting plate as shown in fig. 11. The relative dimensions are most important, for, should the covering plate " *cd* " be too small or too far away from the flue, conditions as in fig. 3 occur, and we find that " *cd* " should be at least twice " *ab*," and the most satisfactory size for " *ae* " is one half " *ab*." This is quite a good terminal, but is liable to fail with the wind in certain directions.

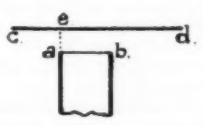


Fig. 11.

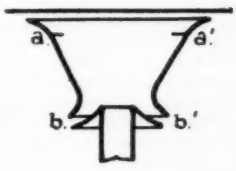


Fig. 12.

In fig. 12 is shown a section through a special terminal designed on these lines and slightly elaborated in order that the wind, when blowing in any direction, may create a small suction effect. Should we apply the previous experiments to this terminal, it will be seen that a small suction effect will be created at all times.

There are some circumstances—viz., when the wind is impinging directly on a flat vertical wall, or a very steep-pitched roof where the air accumulates and builds up pressure for a certain distance out from that wall—when it is necessary that, for the satisfactory operation of this terminal, it should be placed outside the sphere of influence—namely, approximately 3 ft. out from that wall. There is still another case that is even more difficult to deal with—namely, when the flue terminates inside a closed area, and the only possible and really satisfactory cure in a case of this description is to raise the flue until the terminal is well above the highest roof of the surrounding buildings.

Balanced Flues.

For balanced flues the general arrangement is as shown in the illustration No. 13. It is not entirely necessary that the flue outlet and air inlet should be placed as shown; they could also be arranged in a concentric manner. It is interesting to note that this arrangement, as far as can be ascertained, was first used in the year 1897. Many attempts have been made to incorporate this arrangement for practical use, and, to my mind, the reason it has never become popular is the difficulty experienced, as summarized by Mr. C. A. Masterman's remark*: " Attention had been drawn to the question of balanced flues. The system was probably familiar to members in some cases in connection with geysers and in connection with gas radiators. The

* " Some Practical Aspects of Instantaneous Water Heating by Gas," by Leopold Friedman, pp. 44-50.

† Dipl. Ing. Meyer (Dresden). G.W.F., No. 16.

* " Combustion, Wind, and Flue Equipment," by C. A. Masterman.

difficulty encountered, even when the air inlet and the terminal outlet were quite close together, was the extreme gustiness, which had rather fogged him in preparation for the work on the paper, when trying to get pressure gradients due to wind over the face of a building. One would have thought that by putting the inlet and the outlet

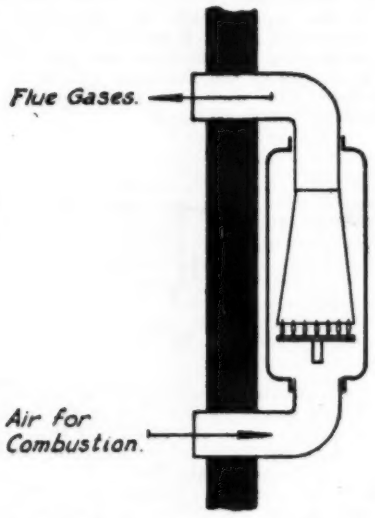


Fig. 13.—Appliance with Balanced Flues.

close together, a few inches apart, all would be well; and very often that was so; but he found that, due to gustiness, one got a wind striking momentarily one terminal just before another, and that might throw one out completely. Another point in that connection which might seem rather obscure was the following: If one placed the terminals, the inlet and outlet, on the wall together, so as to offset any down-draught effect, and there was a gas burner in the closed system, and a wind struck the outside, if the length of path from the inlet to the burner and from the outlet to the burner was not quite the same length, then the pressure wave struck the burner from the one side before the other, and that caused trouble."

When discussing the effect of atmospheric conditions on the behaviour of flues, it must be remembered that the evacuation of the flue gases, being caused by the pressure difference between the inside and the outside of the flue, is extremely small. This out-of-balance force available can be easily nullified by any increase in static pressure at the flue outlet without the corresponding increase at the flue base. Due to the effect of buildings placed in the air stream, these high pressure conditions are extremely frequent. The static pressure on the wall of a building given rise to by a wind normal to the wall surface can be calculated from the expression given by W. H. Dines and others —namely:

$$P = \frac{\frac{1}{2} G U^2}{g}$$

where P = Pressure on plain surface in lb./sq.ft.
G = Weight of air in lb./cu.ft.
U = Velocity in ft./sec.
g = Acceleration due to gravity in ft./sec./sec.

Values given by this are on the high side when compared with the results obtained by Mr. A. Bailey*, who made full scale tests on a large shed, fig. 14. This is probably due to the fact that the measurements were not taken in the centre of the wall.

I have been trying to obtain information on the pressure gradient which exists away from the wall, but the information is scanty; it can safely be said, however, that an obstruction placed in an air stream influences the pressure for a distance of several times its height, and that the static pressure at a distance of 1 to 2 ft. away is much the same as that on the wall face.

Theoretical Considerations.

In the following tests, which were made only to discover safe limits for flue dimensions, the heaters employed had an efficient draught diverter specially designed for the appliance, and a combustion chamber which was self-supporting as far as air requirements.

Connecting Flue.

It is only the most modern appliances which have draught diverters from which the outlet resistance has been eliminated, and it is therefore necessary for the majority of heaters to incorporate a vertical rise of flue pipe in the installation to compensate for this. This should, in a correct installation, be part of the connecting flue. The connecting flue is taken into the main flue by means of an elbow or bend, and as the forces which are available are small, it is important to reduce changes of direction to a minimum, and where unavoidable, they should be such as to preserve the streamline flow of the flue gases.

The conclusion that can be drawn from several experiments is that:

(*a*) The outlet resistances of appliances should be as small as possible.
(*b*) Where the main flue pipe height is limited, the total height necessary will be reduced if as much vertical rise as possible follows immediately after the appliance.

I realize that in most modern houses with low ceilings this may be difficult, but it is usually possible to include a foot before connecting the bend leading to the main flue.

A comparison of the compensating heights required for heaters connected to the main flue by means of 90°, 120°, and 150° bends shows that with 150° bend the compensating height required is contained in the bend itself, and the total height is 0·25+0·4 m.=0·65 m., as against the 1·9 m. required for the arrangement using a 90° bend.

The velocity of the flue gases is also an important consideration, and with a better designed draught diverter, with an outlet resistance of 0·12 m. and a large flue pipe socket of 0·13 m. diameter, owing to the more streamline

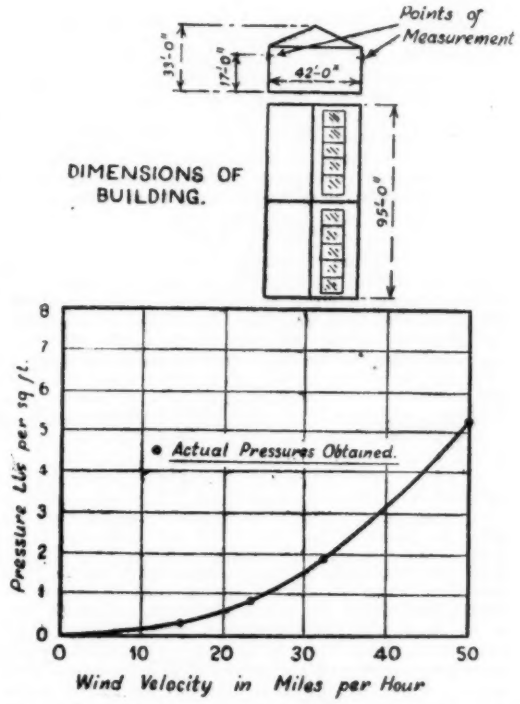


Fig. 14.—Curve showing Pressure on Wall Face set up by Winds of Different Velocities. Direction of wind approx. normal to wall face.

[Reproduced by the kind permission of Mr. Alfred Bailey and the Secretary of the Institution of Civil Engineers from the Paper "The Effect of Wind Pressure on Buildings."]

flow thus obtained, the compensating heights are considerably smaller.

The general conclusions to be drawn from the above are as follows:

1. The appliance should be connected as near as possible to the main flue, so as to avoid long horizontal runs.
2. The connecting flue should be of the same diameter as the flue socket of the appliance.
3. As long a vertical length as possible should be fixed immediately above the heater.

* "Wind Pressures on Buildings." Selected Engineering Paper No. 139, Institution of Civil Engineers.

4. Change of direction should preferably be produced by obtuse bends.
5. The connection between the connecting flue and the main flue must not reduce the cross sectional area of the main flue.

Main Flue.—To obtain data for main flues for gas water heaters a series of experiments were performed, the experimental plant being so constructed as to simulate service conditions as closely as possible. For this purpose a special building was erected which is illustrated in fig. 15. This arrangement allowed for a large variety of installations to be tested. Arrangements were also made whereby flues of different materials could be built and tested. For these tests it was important that wind conditions should be excluded and the flues terminated in such a position that back draught was impossible. The floors were inter-connected by openings, as illustrated in fig. 15.

For the study of flue conditions a meteorological station was fitted on the roof in order that wind velocities, temperatures, humidity, hours of sunshine, &c., could be measured. Also a special tilting wall was built which could be inclined at any desired angle to the flue terminal and the required back draught or static conditions artificially produced.

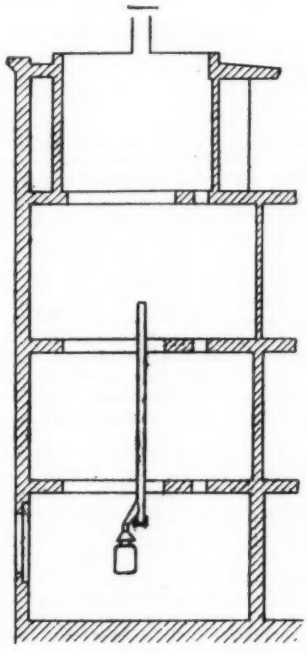


Fig. 15.—Section of Experimental Building.

The two questions regarding flues which are of main interest to the engineer or builder are:

(*a*) Dimensions.
(*b*) Material.

When discussing the dimensions of the main flue for gas water heaters, one has to realize that the materials employed fall into two main categories—namely:

(*a*) Materials of high conductivity and small thermal capacity.
(*b*) Materials of low conductivity and high thermal capacity.

With instantaneous gas water heaters connected to the latter group, conditions of equilibrium are never reached, and the flue gases are bound to cool, with the result that some of the aeromotive force will be lost. For this reason it is most important to investigate the heating-up period of a flue of high thermal capacity. This condition being extremely unstable, accurate data is difficult to obtain. Fig. 16 gives the time taken to heat up a galvanized-iron flue and a built-in flue.

At first, I should like to describe the results obtained with flues falling in the first category, namely, flues with high conductivity and small thermal capacity.

As previously mentioned, our most important concern is the evaluation of the cross-sectional area of flues for appliances of different outputs, operating with flues of various heights. In the first instance, an instantaneous gas water heater was taken with an output of 390 K. cals. per minute, with a flue socket of 130 mm. diameter. This was connected to the main flue, consisting of a galvanized-iron flue pipe by means of:

(*a*) An obtuse bend of 100°.
(*b*) An obtuse bend of 150°.

Experimental points were obtained for the flue heights necessary for the complete evacuation of the flue gases for different cross-sectional areas of the main flue. The results are shown in fig. 17. From this you can see that the

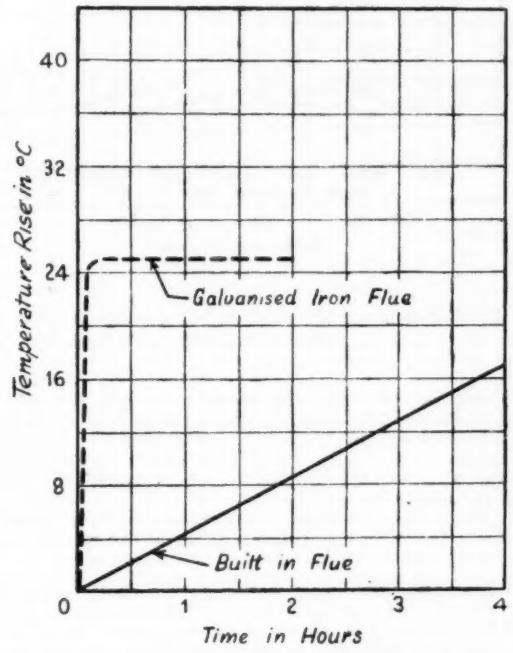


Fig. 16.—Heating Up Period of Flues of Different Materials.

smaller values of cross-sectional area, the height required for evacuation rises rapidly. This is due to the fact that the resistance offered by the main flue to the flow of the flue gases varies as the square of the velocity, and therefore the curve is in the form of a parabola. It can also be seen that 90 mm. diameter is the practical limit for a flue for this particular output, as beyond this point the curve rises too steeply and the installation becomes uneconomical. The influence of the angle of entry of the primary flue is also clearly illustrated, and is particularly noticeable for flues of smaller cross-sectional areas.

In practice, the known factors are the height and the output, and it is necessary, therefore, to obtain similar curves for appliances of different outputs.

Before discussing the values for cross-sectional areas for appliances of different output, I should like to investigate the question of the relationship between pull and resistance. Fig. 18 shows the sort of relationship that may be expected to exist in a flue. Curves (*a*) and (*b*) show the "pull" curves which start at the outlet of the appliance, and rise rapidly as the height is increased, eventually becoming parallel to the ordinate owing to the fall of the temperature and increased resistance. In curve (*c*) the resistance is plotted against the height of the flue. This will naturally be a straight line. The initial value of this curve will not be zero, but will be equivalent to the resistance of the appliance under consideration. It will be seen that the resistance curve cuts the pull curve (*a*) at two points. Point (i.) represents the height necessary to produce just sufficient "pull" to counteract the resistance, and is the minimum height required for complete evacuation under the particular set of circumstances taken. Beyond this the "pull" exceeds the resistance, and additional air is drawn in through the hood of the draught diverter. This, in turn, increases the volume of the flue gases, thereby increasing the velocity and lowering the temperature, and the increase of "pull" with height is proportionately reduced until the curves again intersect at (ii.), where the "pull" is exactly equal to the resistance. It follows from this that for correct operation of the flue the minimum height is at (i.) and the maximum at (ii.), and for all intermediate values the evacuation of the flue gases will be complete. In actual practice, where conditions are variable, it is essential that a margin of safety

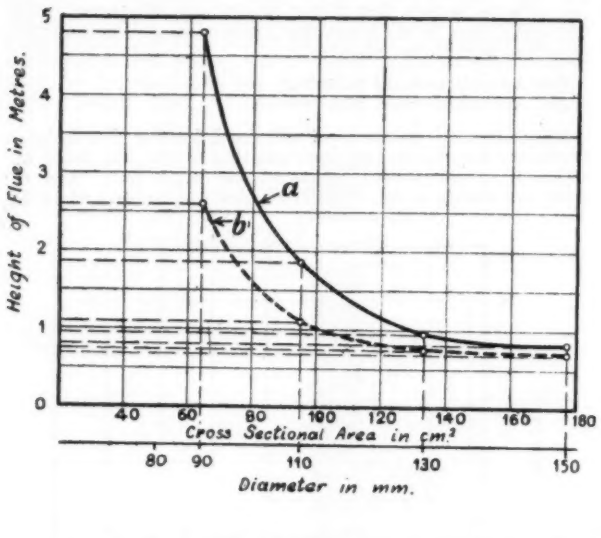
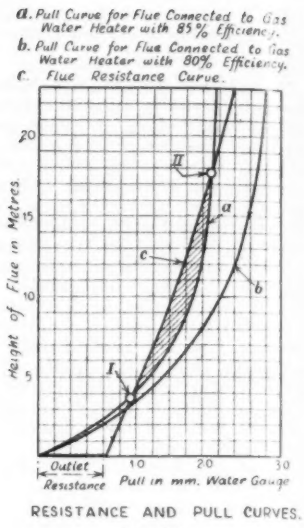


Fig. 17.—Curves giving Correct Cross Sectional Area for Flues of Different Heights. Output of Appliance = 390 K.cal./Min.


a. Pull Curve for Flue Connected to Gas Water Heater with 85% Efficiency.
b. Pull Curve for Flue Connected to Gas Water Heater with 80% Efficiency.
c. Flue Resistance Curve.
Height of Flue in Metres.
Outlet Resistance
Pull in mm. Water Gauge

RESISTANCE AND PULL CURVES.
Fig. 18.

is allowed for, and that the optimum height is taken; in the hypothetical curve under consideration 8-12 m. Where, as is always found in practice, the flue height is fixed, and it is necessary to ensure that this height lies within points (i.) and (ii.) for the particular set of conditions under which the appliance is to be operated.

To obtain this, the slope of the resistance curve must be decreased, thereby raising the position of the critical point (ii.). This result can be achieved by means of:

(*a*) Increasing the cross-sectional area of the main flue and decreasing the velocity of the flue gases.
(*b*) Decreasing the efficiency of the heater, thereby increasing the pull, owing to the higher temperature of the flue gases.

An indication of the effect of height and excess air on pull is given by obtaining the values for the CO_2 content for flues of different heights and diameters. In the curve in fig. 19 the CO_2 contents are plotted against flue heights

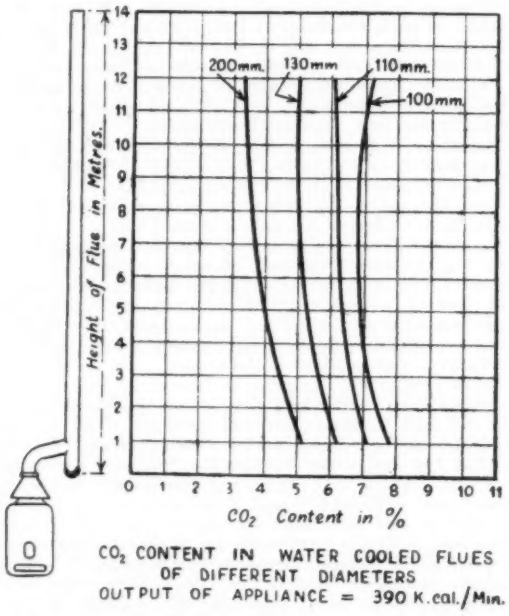


Fig. 19.—Curves giving CO_2 Content in Flues of Different Diameter. Output of Appliance = 390 K.cal./Min.

for flues of varying diameters. The appliance used for these tests was an instantaneous gas water heater with a consumption of 390 K.Cals. per minute, and had an efficiency of 80% on the gross calorific value.

For the interpretation of these curves, in the light of the above theoretical deductions, one has to realize that, as long as the CO_2 content decreases, the flue "pull" exceeds the resistance, and additional air is drawn in; the flue gases will therefore be completely evacuated. From the curves in fig. 19 it can be seen that this condition prevails for flues of 150 mm., 130 mm., and 110 mm. diameter to the full height of 13 m. or up to the limit of observed tests, whereas for a 90 mm. flue the maximum permissible height is from 8 to 9 m. From this point onwards, there is a definite reversal of the CO_2 curve, which indicates that the "pull" will decrease with any increase in the height, or that the resistance is greater than the "pull." The flue gases, therefore, may be expected to emerge from the hood of the draught diverter if the height is increased.

Similar tests for heaters of larger output were carried out, and the figures for the safe loading per unit cross-sectional area were obtained for various flue heights. These are plotted against flue height in fig. 20. Greater margin of safety had to be taken for the smaller value of the flue height, because of the limited aeromotive force available, which could easily be upset by slight changes in the prevailing conditions. From these curves the corresponding values for cross-sectional areas were calculated by dividing the output by the specific loading, and are shown by the full curves in fig. 20.

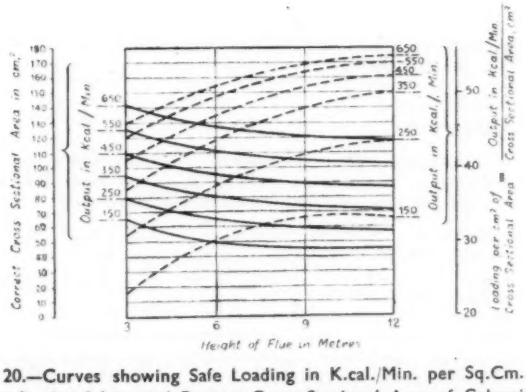

Correct Cross Sectional Area in cm²
Output in Kcal/Min
Output in Kcal./Min
Output in Kcal/Min
Loading per cm² of Cross Sectional Area
Height of Flue in Metres

Fig. 20.—Curves showing Safe Loading in K.cal./Min. per Sq.Cm. of Cross Sectional Area and Correct Cross Sectional Area of Galvanized Iron Flue for Appliances of Different Outputs.

Flues of Low Conductivity and High Thermal Capacity.

I shall now describe the tests taken on flues of high thermal capacity and low conductivity. These conditions were obtained by using a water-jacketted, galvanized-iron flue. The temperature of the cooling water was kept constant so that the state of affairs was similar to that ob-

tained in a brick flue during the initial heating-up period. The original intention was to adjust the flow of cooling water so that the thermal capacity of one metre height corresponded to the same height of brick flue of half a brick in thickness. Unfortunately, the head of water available was not sufficient to obtain data on long flues, and it was therefore decided to restrict the flow of cooling water so that one metre of galvanized-iron flue had the same thermal capacity as three-quarters of a metre of brick flue. The artificial conditions thus produced were not identical with those found in practice, because the cooling water flowed upwards, and the temperature of the flue walls was therefore higher at the top, whereas in an actual installation the reverse would be the case. As, however, a limiting case was taken, which would never be met with in practice, the values obtained are well on the safe side.

(To be continued.)

Some Fuel Problems on Gas-Works

by
J. E. DIXON
(of the Newcastle-upon-Tyne and Gateshead Gas Company)

We publish below a report of the discussion which followed Mr. Dixon's Paper before the North of England Gas Managers' Association on May 7—see last week's "JOURNAL."

The PRESIDENT, complimenting Mr. Dixon on his Paper, said the Author had added an invaluable chapter to their technical literature.

Mr. W. W. ATLEY (Stockton), opening the discussion, said the Paper was of considerable importance in their pursuit of ways to cheapen the cost of producing gas—not only to create dividends, but to keep "the enemy" as far away as possible. He would like to emphasize that it was essential to have the raw material in as pure a state as possible, and where it could be arranged washed coal should be used at gas-works. Where undertakings were able to make use of coke oven gas, they were in a privileged position. From the Paper, it would seem Mr. Dixon was able to employ gas at 8d. per 1,000 cu.ft.; and if that were so, it was a good proposition as coke prices stood. In the North they were particularly interested in coke prices, and the question of fixing a value for coke to-day was one of great importance. They had the assistance of the coke oven producers, and he hoped that would continue. The Paper would be an encouragement towards the greater production of large coke with an outlet for the breeze in the heating of retorts. As to the use of gas for heating retorts, he remembered, years ago, when gas had been employed in this manner. Under modern conditions, Mr. Dixon had proved that this form of heating could be economical and practical.

Mr. RICHARDSON said that the Paper, to him, provided a text for a thesis on the subject of the possible future developments in the Gas Industry. Mr. Dixon had shown that a swing of the economic pendulum in a certain direction might result in the elevation of coke from the position of a by-product to one of primary importance, inasmuch as it was a practical proposition to employ huge quantities of gas instead of coke for the heating of retorts. There was a growing demand for a solid smokeless fuel of good quality, which might be produced by either high or low temperature carbonization; and he wondered whether in the future they would, as an Industry, concentrate on the selling of one product only—gas—or exploit to the full the whole of the products of the distillation of coal. He regretted that low-temperature carbonization should be growing up apart from the Gas Industry, just as the coke industry had in the past. He believed gas-works should exploit all methods of carbonization. It was the full exploitation of by-products that would in the future, he believed, have a greater influence on net revenue than the marketing of huge volumes of gas at cut prices.

Mr. C. DRU DRURY (Sunderland) said that there was, no doubt, great scope in the method of heating retorts which Mr. Dixon had described. Those undertakings which had the advantage of bulk supply of gas at cheap prices must find the method an attractive proposition. He always thought figures relating to the consumption of coke for fuel in retorts should be based on statistics for dry coke. In some respects, he thought Mr. Dixon's figures high. He himself had not been able to secure 13¾ cwt. of coke and breeze per ton of coal, so that 15 cwt. was an extremely good figure.

Mr. R. N. WEBB said that some of them only used horizontal retorts, whereas the Paper was based on vertical retorts; but he agreed that the Paper had certainly opened up the question of heating retorts generally by other methods. Mr. Dixon's figures would be helpful to others pursuing this object. Referring to the moisture content in coke, Mr. Webb said that in the near future it was going to be a deciding factor in the sale of coke. The coke oven producers had set their house in order to secure the coke markets. Gas undertakings, he thought, had been a little belated in their efforts in this direction. No doubt they had made strides in the question of moisture content, but the public were getting used to carefully graded coke with low moisture content. Turning to the heating of horizontal retorts, Mr. Webb asked the Author how many therms would be necessary to secure temperatures of about 1,400° C. as compared with the temperatures of from 1,200° to 1,300° which the Author mentioned. Mr. Dixon's figures for the gas showed 30% carbon monoxide at 700° to 730° C., but he did not mention the hydrogen content.

Mr. F. NICHOLLS (Gateshead), complimenting Mr. Dixon on the Paper, said that it applied to a certain set of conditions. He hoped its reception might encourage a similar Paper where, however, coke was a drug on the market.

The Author's Reply.

Mr. DIXON, replying to the discussion, agreed with Mr. Atley that washed coal was worth while in that it simplified firing and reduced the amount of supervision necessary. The problem with ash was not so much its quantity as its characteristics. Mr. Drury had mentioned dry coke, and his figure of 13¾ cwt. was a very reasonable one. He had not taken into account the coke being dry, but he did not suggest the difference between 13¾ cwt. and 15 cwt. was accounted for by moisture. He had got over 14½ cwt. on different plant results, and with a little moisture the figure became 15 cwt., which was used as a round figure. In answer to Mr. Webb, Mr. Dixon said he did not think it likely that temperatures of 1,400° C. would be reached with gas and air alone, but it might be possible with waste gas addition. He believed temperatures of 1,380° C. might be reached but he had no evidence of that. The Fuel Research Board, he believed, had reached 1,300° C., but they made no statement of what excess over this figure, if any, was reached. The question of capital involved in any adoption of his method depended on the plant and, of course, what changes, if any, would be necessary. As to the gas analysis figures, he was himself somewhat startled to find 30% of carbon monoxide. He made tests of other producers and found the figure the same. That figure was also obtained in ordinary coke furnaces. The hydrogen figure varied between 8 and 10% in producer gas.

Mr. H. D. LEES (Hexham) moved a vote of thanks to the Author, which was seconded by Mr. W. O. KIRKWOOD (Sunderland) and was supported by Mr. F. P. TARRATT, who said that the experimental work had given anxiety, but Mr. Dixon had taken great interest in it and had set about the task of burning breeze in producers designed for coke.

Extension to be Carried Out at Motherwell

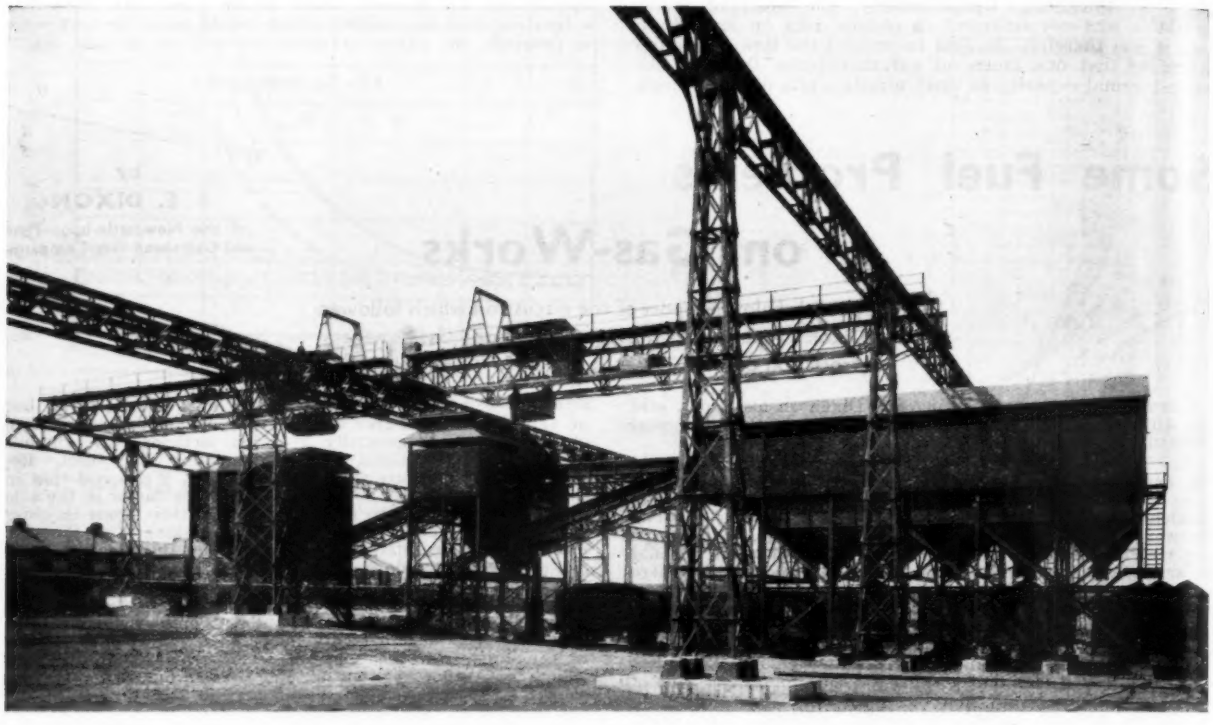
Increasing Demand for Gas

Approval was given by Motherwell Town Council on May 4 to the recommendation of the Gas Committee that a scheme of extension amounting to £36,500 be carried out at the Burgh Gas-Works at Merry Street, Motherwell.

During the last few months, states Mr. A. McDonald, B.Sc., Engineer and Manager, large demands have been made on the gas supply of the Burgh which would tax the capacity of some units in the future. Last year a record output was established at the Undertaking, he adds, and it is apparent that this will be exceeded in the present year. For the year ending May, 1937, the output in therms, it is estimated, will reach 1,639,437, an increase of 2% over 1935 and an increase of 9·1% during the past five years.

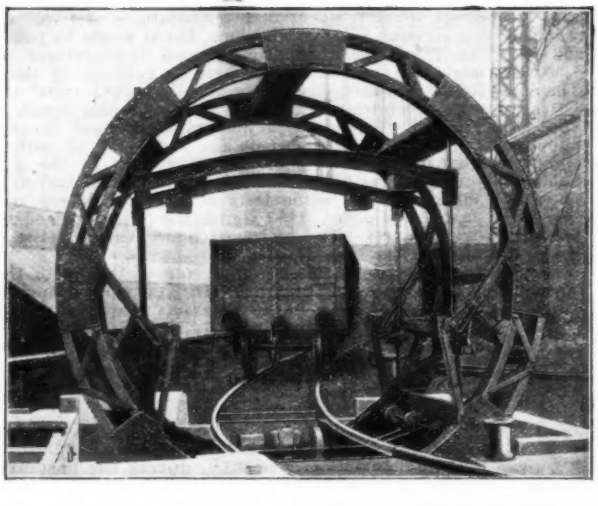
During the last few months several new consumers have been added, which gives an indication that the future demand for industrial purposes is likely to show an enormous increase. The estimated annual requirements of the new consumptions are as follows: Roll heating, 250,000 cu.ft.; space heating, 1 million cu.ft.; furnace work, 1,500,000 cu.ft.; furnace work, 10 million cu.ft.; and furnace work, 15 million cu.ft.; while additional installations presently under consideration are likely to require some 35 million cu.ft.

Among the new requirements are a carbonizing plant, condensers, exhausters, appliance repair shop, coal store, coke-handling plant, and benzole plant.



COKE HANDLING

& SCREENING PLANTS



WAGON TIPPERS

OF ALL TYPES

ROBERT DEMPSTER & SONS LTD.

ELLAND

TELEPHONE: 261-2-3 ELLAND.
TELEGRAMS: DEMPSTER, ELLAND.

LONDON OFFICE:
16, QUEEN ANNE'S GATE, WESTMINSTER, S.W. 1

ANNUAL MEETINGS OF ASSOCIATIONS

North of England Gas Managers' Association

The Annual Meeting of the North of England Gas Managers' Association was held at the County Hotel, Newcastle, on Friday, May 7.

Mr. J. CORRIGAN (Brighouse), the President, presided at the luncheon prior to the meeting and welcomed Mr. R. N. Webb (President of the Manchester District Gas Managers' Association) as a visitor.

Dr. J. T. Dunn, public analyst for Northumberland, Newcastle, and Gateshead, was elected President for the ensuing year. He was President of the Society of Public Analysts in 1931-32 and was also President of the Society of Chemical Industry in 1933-34. Mr. A. H. Bagshaw (Sunderland) was elected Vice-President.

Three members were elected to the Committee—namely, Messrs. H. P. Allison (Redcar), J. R. Bradshaw (Hartlepool), and H. Galleway (Whitby). Mr. H. Douglas Lees (Hexham) was re-elected Secretary for the eighth successive year, and Mr. A. Pickering (South Shields) was re-elected Auditor.

Mr. F. J. Webster (West Hartlepool) was elected a Member and Mr. R. P. Davison (South Shields) and Mr. J. M. A. Mitchell (Newcastle) Associate Members.

The PRESIDENT referred to the loss the Association had sustained by the death of Mr. C. F. Blincoe, former Engineer and Manager of the Middlesbrough Corporation Gas Department, and President of the Association in 1929-30. He was a man of outstanding personality and genial, happy disposition, said Mr. Corrigan. As a mark of respect, the gathering stood in silence. Mr. Blincoe's successor, Mr. J. W. Pallister, was congratulated on his appointment.

It was decided to give a donation of £10 10s. to the Benevolent Fund of The Institution of Gas Engineers, and Mr. F. P. TARRATT (Newcastle), reporting on the work of the fund, urged that contributing members increase their subscriptions and appealed for further subscribers.

Mr. J. E. DIXON then gave his Paper on "Some Fuel Problems on Gas-Works," which was published in last week's "JOURNAL;" a report of the discussion which followed appears elsewhere in this issue.

Mr. Drury was re-elected to the Educational Advisory Committee and Messrs. Drury, Tarratt, A. E. Ruffhead (Darlington), R. H. Duxbury (South Bank), and J. M. A. Mitchell (Newcastle) to the District Education Committee. Mr. Drury reported on the work of both Committees. The resignation of Mr. Herbert Lees was accepted with regret from the latter Committee.

To mark Mr. Corrigan's year of office as President, Dr. J. T. DUNN presented Mr. Corrigan with a Presidential Certificate, and, in acknowledging, Mr. CORRIGAN thanked the Secretary and members of the Committee for their assistance.

A vote of thanks to the retiring President, Committee, and Auditor was accorded on the proposition of Mr. A. G. ANDERSON (Shotley Bridge), seconded by Mr. W. BATT (Newcastle).

The meeting concluded with tea in the County Hotel.

The London and Southern District Junior Gas Association

The Annual General Business Meeting of the London and Southern District Junior Gas Association was held on Friday, May 7, at the London School of Hygiene and Tropical Medicine, Kepple Street, W.C. 1—the PRESIDENT (Mr. R. Summerson, of Luton) in the chair.

The ASSISTANT HON. SECRETARY (Mr. H. J. Risby, South Metropolitan Gas Company) read the minutes of the previous general meeting which were confirmed and signed, after which the PRESIDENT extended a cordial welcome to Mr. R. J. Milbourne, one of their Patrons, who was present at the meeting.

The financial statement for the past year was then presented by the HON. TREASURER (Mr. H. G. Soar, Gas Light and Coke Company), who remarked that this was the twelfth and last occasion on which he would have the privilege of so doing. He had been a member of the Association for 24 years, the last twelve of which as their Hon. Treasurer, and he would like to take this opportunity of thanking the members he had met during that long period for their kindness and friendship to him. Before them that year, went on Mr. Soar, was the most satisfactory financial report he had had the pleasure of giving them; they had an amount in hand of almost £349. It was, however, the wish of the Council that they should not build up a large reserve, but rather give the members the benefit of the money they had in hand. Mr. Soar paid tribute to the Hon. Auditor for the thorough way in which he went through the accounts, and said that his work as Hon. Treasurer had been very happy.

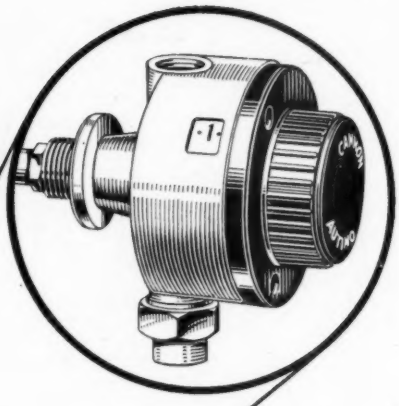
In moving the adoption of the financial statement, Mr. F. C. SMITH (Gas Light and Coke) referred to the sound position of the Association, and said he hoped the Council would utilize the funds available to the best advantage of the members. They wished their new Hon. Treasurer the same success that Mr. Soar had had, and in conclusion he added a personal word of thanks to the latter for the work he had done during Mr. Smith's own term as President, which he thought had been the experience of all those who had had the privilege of occupying the chair while Mr. Soar had been Hon. Treasurer.

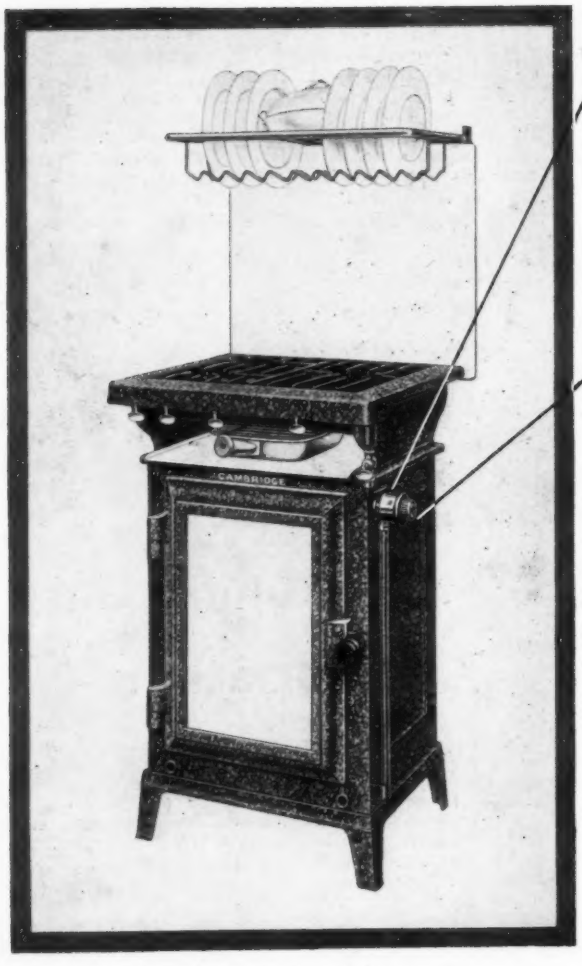
The resolution was seconded by Mr. J. GRAYSTON (Romford) and carried unanimously, after which the President introduced Mr. S. J. Gibbons (Gas Light and Coke) as the new Hon. Treasurer, at the same time wishing him a very happy term of office.

The President's Report.

The PRESIDENT then presented his report on the work of the Association during the session 1936/37. He stated that the membership of the Association now stood at a total of 499, which was made up of 493 members and associate members and 6 hon. members. There had been an increase of 92 in membership during the past six years. The activities of the Association had been fully maintained; they had had four Papers, covering a wide range of subjects, in addition to a discussion evening. He was happy to announce that Mr. J. Grayston's Paper on "Gas Law" had been awarded the Silver Medal of the Society of British Gas Industries. The visits in which they had taken part had also been of great educational value. Their Annual Dinner was most successful, and they had been honoured on that occasion by the presence of a number of distinguished guests, chief among whom was the President of The Institution of Gas Engineers, Mr. Stephen Lacey. The Association had enjoyed a very good Press during the session, and they greatly appreciated the full reports

Autimo





The reliable Oven Heat Control on

CANNON COOKERS

CANNON IRON FOUNDRIES LTD., DEEPFIELDS, NR. BILSTON, STAFFS.

which the Technical Press had given of their Papers and visits.

The President expressed his personal thanks and the thanks of the Association to all those who had read Papers to them during the session and to the Directors and chiefs of all those firms whose works they had been kindly allowed to visit. He would particularly like to acknowledge the support which his own Directors and his Chief, Mr. W. Phillips, had accorded him during his year of office. The members, he added, would have the opportunity of visiting the works, stove renovation shops, and showrooms of the Luton Gas Company on Saturday, June 19, by kind invitation of the Management.

Finally, Mr. Summerson acknowledged his indebtedness to the Council, and particularly to the Hon. Secretary, Mr. Higton, and the Hon. Treasurer, Mr. Soar, for their support during the session. It had been a very real pleasure to him to work in close co-operation with Mr. Higton in the work of the Association; the latter's work for the Association was quite invaluable. Nor could he let this occasion pass without placing on record the great indebtedness they owed to Mr. Soar, who was resigning his office of Hon. Treasurer after twelve years of valuable service. The Hon. Treasurer was a hard-worked officer, and the present healthy state of the Association's finances was in no small measure due to the industry and enthusiasm of Mr. Soar. They accepted his resignation with the greatest regret, but he could rest assured that his valuable services to the Association would never be forgotten. In conclusion, Mr. Summerson appealed to the members to do all in their power to support his successor the chair, Mr. R. N. LeFevre, to whom he wished a very happy and successful year of office.

Education.

The PRESIDENT went on to express the thanks of the Association to Mr. T. H. Prater, who, as Hon. Secretary of the Southern District Education Committee of The Institution of Gas Engineers, did much valuable work on their behalf. Mr. Prater kept in touch with the developments of the Education Scheme, through attendance at the Gas Education Committee Meetings of the Institution, and passed on information to any candidates who wrote to him for advice; he also made up the panel of Gas Fitting Examiners for the City and Guilds of London Institute Examinations and arranged accommodation at adjacent gas undertakings for those engaged in the supply side who wished to take the B.C.G.A. Gas Salesmanship Course Examinations. The scheme was functioning very smoothly in the South-Eastern Area, thanks very largely to the work of Mr. Prater.

Moving the adoption of the President's report, Mr. J. M. WEBBER (Croydon) thanked Mr. Summerson for his interesting statement and added that they owed their President a tremendous lot for the wonderful year he had given them. Every Paper and visit had been of outstanding interest. The proposition was seconded by Mr. H. MOYS (Croydon) and carried unanimously.

A cordial vote of thanks was accorded to the Officers and Council for their services during the year on the proposition of Mr. H. SIMPSON (Guildford), seconded by Mr. B. W. DAWKINS (Gas Light and Coke), it being remarked that a great deal of the success of the Association was due to the work of these gentlemen.

In proposing that a presentation be made to the retiring President in recognition of his services to the Association, Mr. H. W. H. BUTTERFIELD (South Suburban) said that Mr. Summerson had performed yeoman work for them during his year of office. They had had a very successful session, which had been due in no small measure to the efforts of the President; he felt sure they would all agree that he had carried out all his duties in an admirable manner. Although it was usual to make a presentation to the retiring President, Mr. Butterfield wished to emphasize that it was no mere formality that they wished him to accept a tangible token of appreciation of all that he had done.

Seconding the resolution, Mr. F. H. HIGTON observed that it had been his pleasure to work with many Presidents, and he could say that Mr. Summerson had in every way satisfied the considerable demands which the work of the Association had made upon his time. During his own term of office as Hon. Secretary, Mr. Higton had made many friendships, among the greatest of which he counted that of Mr. Summerson.

Mr. H. G. SOAR also supported the resolution and paid his tribute to Mr. Summerson.

The proposition was cordially accepted, and in acknowledgment Mr. SUMMERSON said that he would always carry in his mind the memories of a very happy year as President of the London and Southern District Junior Gas Association. He had always recognized the importance of the work of the Junior Associations inasmuch as they definitely assisted the junior members of the Industry in their work. His own pleasure in being their President was adequate reward in itself for anything he had been able to do; nevertheless, he would greatly value this tangible expression of their esteem.

The PRESIDENT went on to propose that a testimonial be presented to Mr. Soar as a token of their appreciation of his work for the Association as Hon. Treasurer during the past twelve years. This was seconded by Mr. HIGTON, who expressed the hope that his retirement from office would in no way sever his connection with them.

The resolution was carried unanimously, and Mr. SOAR made suitable acknowledgment.

New Officers and Council.

The following Officers and Council were elected for the ensuing year:

President.—R. N. LeFevre (Gas Light and Coke).
Senior Vice-President.—S. C. Waldock (Gas Light and Coke).
Junior Vice-President.—H. W. H. Butterfield (South Suburban).
Hon. Treasurer.—S. J. Gibbons (Gas Light and Coke).
Hon. Secretary.—F. H. Higton (East Surrey).
Assistant Hon. Secretary.—H. J. Risby (South Metropolitan).
Hon. Auditor.—G. Wilson Smith (Gas Light and Coke).
Council.—H. H. Brown (Southampton), G. Dougall (Gas Light and Coke), J. Grayston (Romford), F. O. Hawes (Tottenham), H. Moys (Croydon), T. G. Noble (Gas Light and Coke), P. Richbell (Croydon), and H. J. Risby (South Metropolitan).

The following were elected as the Association's representatives on the District Education Committee: Messrs. T. H. Prater, S. C. Waldock, R. N. LeFevre, and F. H. Higton.

On the proposition of Mr. WALDOCK, seconded by Mr. RICHBELL, it was agreed that a letter be sent to Dr. J. H. Long (the Principal of the Westminster Technical Institute), expressing the appreciation of the Association for the facilities provided by him and his staff.

A vote of thanks to the Technical Press was accorded on the proposition of the PRESIDENT, seconded by Mr. LEFEVRE, and was duly acknowledged by Mr. F. CLIFTON SHERRIFF ("GAS JOURNAL") on behalf of himself and his colleagues. Votes of thanks were also accorded to the scrutineers—on the proposition of the PRESIDENT, seconded by Mr. GIBBONS—and to the Hon. Auditor—on the motion of Mr. GRAYSTON, seconded by the PRESIDENT. It was also announced that one of their members (Mr. C. I. Winstone, of the Gas Light and Coke Company) was the President-elect of the Association of Public Lighting Engineers, and an appeal was made to members to support him during his year of office in whatever way they could.

With reference to the resolution passed at the last Annual Business Meeting in connection with the subdivision of the Association into groups representative of the varying interests of members, the PRESIDENT stated that pressure of other work had prevented the Council from giving full consideration to the proposal; but a subcommittee had been formed to examine the matter and report on whether anything could be done in this direction.

Various suggestions were subsequently put forward for Papers and visits for the coming session, and the meeting terminated with a few words from Mr. R. J. MILBOURNE, who expressed his pleasure at being with them on that occasion. His visit to their meeting had been well repaid by the enjoyable evening he had had among them. It was, he added, a pleasure to attend a meeting which was carried through in such a businesslike way.

Coking Plant for Turkey

Order Placed with Simon-Carves, Ltd.

A complete new iron and steel works is to be erected by the Turkish Government at Karabuk, about 130 miles north of Ankara, the capital of Turkey in Asia, or Anatolia, as it is called. The contract for the work has been placed with Messrs. H. A. Brassert & Co., Ltd., of London. They have now given the order for the complete coking plant in connection with the new Works to Messrs. Simon-Carves, Ltd., of Cheadle Heath, Stockport.

The contract is for 42 Simon-Carves "Underjet" compound coke ovens of the "Otto" twin-flue type, with all necessary coke oven machinery, and a complete by-product plant, including crude benzole and rectification plant and electrostatic detarrers. Messrs. Simon-Carves' contract also comprises wagon tippler, coal handling plant, blending bunkers, reinforced concrete service bunker of 2,000 tons capacity, coke wharf, coke quenching station, and coke handling and screening plant.

Instantaneous supply of HOT WATER

TO KITCHEN SINK, WASH BASIN, ETC.

The "Prestot" is now supplied in two forms. The Standard form has hot and cold water taps neatly finished with bakelite covers, coloured red and black respectively. By the use of these, water at any temperature from cold to very hot can be obtained at will. Other features include the bye-pass safety device ; automatic gas and water valve ; rust-proofed cast iron burner with independently fixed burner jets ; combustion chamber of the non-condensing type ; flexible fixing.

The Alternative form has a single hot water tap, and is normally for use where more than one water tap is already available at the sink. It is further equipped with a swivelling chromium-plated outlet spout attachment.

The water can be used for culinary purposes, whether hot or cold.

The finishes are white, green or blue porcelain enamel. The fittings are chromium-plated.

Full particulars and descriptive literature obtainable on request.

☆ PRESTOT ☆

INSTANTANEOUS WATER HEATER

R. & A. MAIN LIMITED, LONDON AND FALKIRK

London Office and Showrooms: 48, Grosvenor Gardens, S.W.1. Glasgow Office and Showrooms: 82, Gordon Street.

The Midland Junior Gas Association

The Annual General Meeting of the Midland Junior Gas Association was held at Birmingham on May 6—the PRESIDENT (Mr. F. A. Jenkins, of Leamington) in the chair.

The PRESIDENT, at the outset, referred to the loss the Association had sustained in the death of Mr. N. C. Kirby, of Birmingham, and those present stood for a moment in silence in respect to his memory.

The Annual Report was then submitted, this showing that the total membership, excluding the eighteen honorary members, was 292; and that during the session there had been 23 applications for membership (which were accepted) and three resignations. The Report contained an expression of thanks to Mr. Leopold Friedman, of Ascot Gas Water Heaters, Ltd., for his very interesting Paper read during the session, as well as to the four members who had also presented Papers—namely, Messrs. D. W. G. Scott (Birmingham), G. E. Stevenson (Long Eaton), W. N. Smirles (Birmingham), and H. Wynne (Burton-on-Trent). The S.B.G.I. Silver Medal had been awarded to Mr. Scott for his Paper entitled "The Coke Treatment Plant at Windsor Street Gas-Works, Birmingham," while the Milbourne Medal had been awarded to Mr. F. J. Bengough (Birmingham) for his Paper on "The Maintenance and Operation of Carburetted Water Gas Machines." It was stated that the Judge in the latter competition was Major F. J. Bywater. Acknowledgment was also made in the Report of the support given to the Association by the Birmingham Gas Department and its General Manager and Secretary (Mr. A. W. Smith). In conclusion, it was reported that members of the Association who had been successful in the 1936 Examinations of The Institution of Gas Engineers numbered: Gas Engineering (Higher Grade), 8; Gas Supply (Higher Grade), 4; Gas Engineering (Ordinary Grade), 6; Gas Supply (Ordinary Grade, single subject), 3.

New Officers and Council.

New Officers and Council for the 1937-38 session were then elected as follows:

President.—E. T. Pickering (Birmingham).
Senior Vice-President.—A. W. Attwood (Coventry).
Junior Vice-President.—W. N. Smirles (Birmingham).
Hon. Secretary.—A. Hill (Birmingham).
Assistant Hon. Secretary.—F. A. Grant (Birmingham).
Hon. Treasurer.—G. W. Smith (Birmingham).
Hon. Auditor.—W. P. Timbrell (Birmingham).
New Members of Council Elected by Ballot.—District Member, A. V. North (Dudley); Birmingham Member, F. J. Bengough.

Address by Dr. E. W. Smith.

An Address was then given by Dr. E. W. Smith (Technical Director of the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd.).

Dr. E. W. Smith stated that to address the Midland Junior Gas Association was like coming home. He attended his first meeting in 1910 and had always been an enthusiastic supporter of the Association. He could not speak too highly of the Junior Gas Associations generally and of the Midland Junior Gas Association in particular.

It was vital that all the young men in the Industry should get a thorough technical training and experience, and apart from the lectures or correspondence courses which they took, the educational value of the meetings of the Junior Gas Associations was very great from every point of view. He was not too satisfied with the facilities that were available for evening class work for the training of juniors. He knew that this was a difficult question because the members of technical colleges could only use the teachers who are available, and although most of the teachers and lecturers were reasonably competent and experienced, their knowledge of teaching, out of the nature of things, was inadequate. If juniors were aiming to have a successful career within the Gas Industry—and no industry was more fascinating or more varied and contained more interest for the intelligent man—they would have to get a clear idea as to what was meant by success.

The Industry was different from most other industries, said Dr. Smith. It was a public service, and every individual must consider himself a servant of the public, whatever his intellectual abilities or his commercial successes, his attitude must be right. While having a proper dignity and healthy pride, his mental attitude must be humble. There was so much room for good men, conscientious and hard working, that petty jealousies among the juniors were entirely out of place. One could not expect to progress unless one was "*prepared*" for every advancement. "Only on results" could one demand advancement.

Another point was that the speaker would like to feel that "honesty" was a slogan for every junior in the Industry—honesty of purpose, honesty in individual transactions, and intellectual honesty. Intellectual honesty could, of course, be carried too far. They all of them knew of the highly scientifically trained man who had been so trained that unless he could prove everything 100% he would make no decisions. Training must be combined with experience, and if progress were to be made, short cuts had to be taken; and where it would be of advantage to get matters proved mathematically or chemically up to the hilt most decisions had to be based on experience and judgment. Consequently, trained juniors would be well advised to be venturesome. Having settled down for a period of four or five years to close study in one place and the acquisition of experience obtainable in that place, and having extracted as much experience as possible, then it was of advantage to the junior and to the Industry that his experience should be diversified and that he should change his job periodically with the object of getting a wider experience.

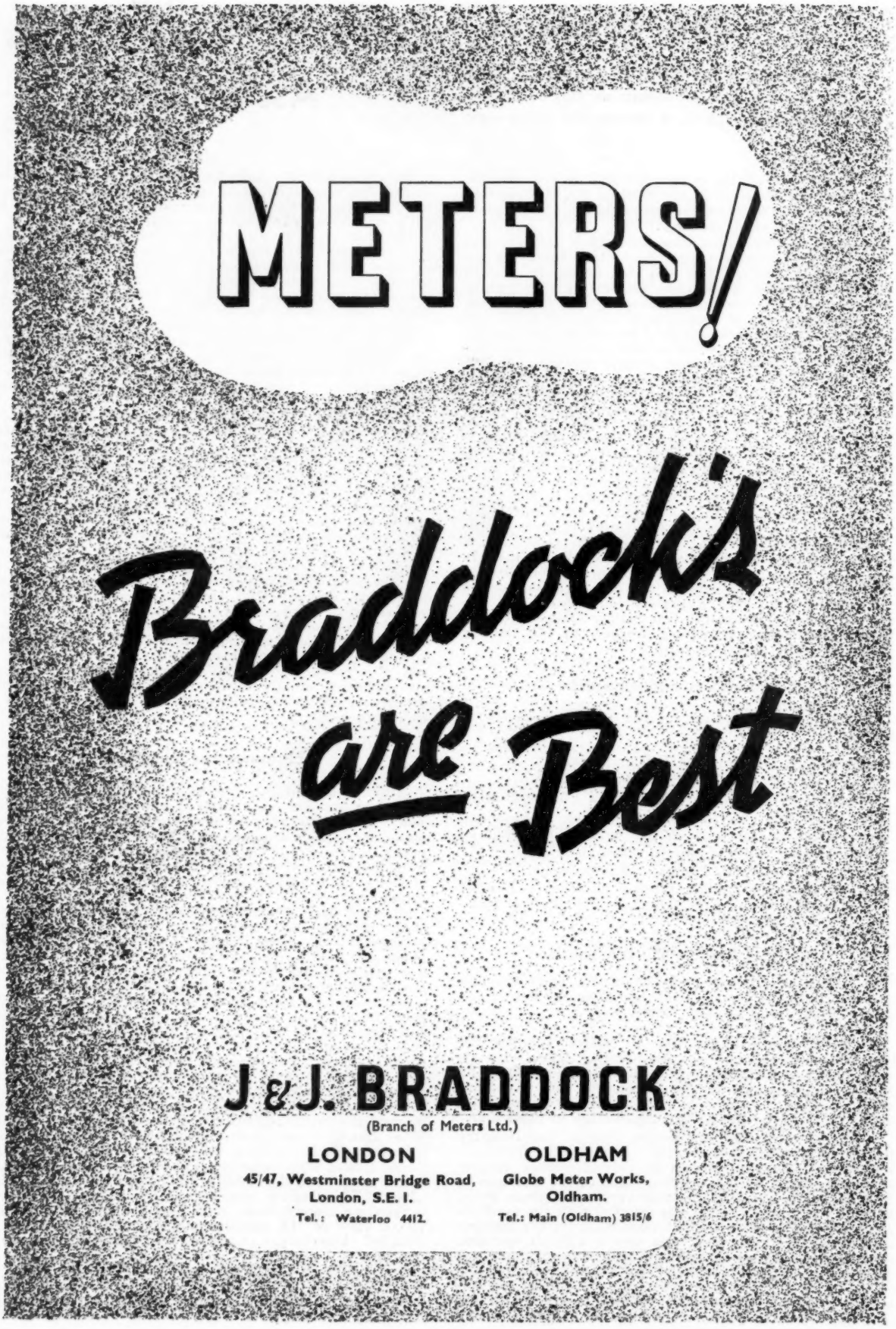
Eliminate Parochialism.

Another advantage of such a procedure was that it tended to broaden one's mind and to eliminate parochialism. There was nothing more pitiable, if it were not amusing, to note the way in which some men, old and young, in all parts of Industry behaved and spoke as if any work done anywhere outside their own organization was of less value than that done in their own immediate surroundings.

A great deal of very good work and experience was being obtained in a very large number of gas undertakings and the more engineers and chemists could get about and visit one another's works to study closely what was going on, the better appreciation there would be of the advantage of such an interchange of experience.

Anyone who was in charge of another had a grave responsibility in connection with the development of the Industry and of the individual, went on Dr. Smith. Seniors should give juniors all the responsibility they could take, and, having given broad directions and advice and without too close a restricting supervision, let the juniors carry on. If they made mistakes, due to lack of judgment or experience, the seniors could take the responsibility without getting too hot about it. On the other hand, if they achieved success, the seniors could afford to let the juniors take most of the credit. Dr. Smith looked with confidence to the future in so far as the future must be in the hands of the juniors who were coming along. There never was a time when there was more enthusiasm among them, or greater facilities for getting a broad view of the requirements of the Industry and a detailed knowledge requisite for progressive modern control.

Perspective was essential, and the sooner this could be developed the better. They wanted no more discussions as to who was the most important, chemist, engineer, salesman, and the like. They were all essential; but the


METERS!
Braddock's are Best
J & J. BRADDOCK
(Branch of Meters Ltd.)
LONDON
45/47, Westminster Bridge Road,
London, S.E. 1.
Tel.: Waterloo 4412.
OLDHAM
Globe Meter Works,
Oldham.
Tel.: Main (Oldham) 3815/6

primary responsibility for the future development of the Industry lay in the hands of the administrator. The chemist as such and the engineer as such were the handmaidens of administration, and if an engineer or a chemist became an administrator he was no longer primarily an engineer or primarily a chemist, and his success would be judged by his capacity as an administrator.

Vote of Thanks.

A cordial vote of thanks to Dr. Smith for his Address was proposed by Mr. T. F. E. RHEAD (Birmingham) and seconded by Mr. H. R. HEMS (Birmingham), both of whom paid tribute to Dr. Smith for his kindness in visiting them. The vote was heartily accorded.

The Wales and Monmouthshire Junior Gas Association

The 15th Annual Meeting of the Wales and Monmouthshire Junior Gas Association was held at Cardiff on May 7—the PRESIDENT (Mr. J. H. Chapman, of Swansea) presiding.

In the absence of the Hon. Treasurer (Mr. B. J. Bell), the financial statement was presented by Mr. R. S. SNELLING (Hon. Secretary), and this indicated that the Association was in a healthy financial condition.

The adoption of the financial report was moved by Mr. W. E. CROWLEY (Newport), who said that it was satisfactory to know that they had held their own during the past year. When the present Hon. Secretary took over office five years ago there was a deficiency, and it was largely as a result of his efforts that they now had a small balance on the right side.

The report was unanimously adopted.

New Officers.

The PRESIDENT moved the election of Mr. H. V. Williams (Cardiff) as his successor in the chair for the ensuing year, remarking that Mr. Williams had been a loyal friend and colleague to him during his own year of office, and no member was more worthy of recognition.

Mr. SNELLING seconded, and the proposition was carried unanimously. Mr. WILLIAMS returned thanks, going on formally to propose the election of Mr. A. E. Pask (Caldicot) as Senior Vice-President, which was carried and briefly acknowledged by the latter.

Other officers were subsequently elected as follows:

Junior Vice-President.—F. Stuart Johns (Swansea).
Hon. Treasurer.—B. J. Bell (Cardiff).
Hon. Secretary.—K. M. Ernest (Cardiff).
Hon. Librarian.—H. S. Bartlett (Cardiff).

Mr. F. B. Snelling (Newport) and Mr. E. E. Moore (Swansea) were appointed to represent the Association on the South Wales Council, and the PRESIDENT paid tribute to the work of the retiring members, Mr. D. E. Wilkins (Swansea) and Mr. W. J. Viney (Cardiff). The President went on to say how much they all regretted the retirement of Mr. R. S. Snelling from the Hon. Secretaryship.

Mr. SNELLING, having referred to the five very happy years he had spent as Hon. Secretary, went on to remind the members of the forthcoming visit they were to pay jointly with the Western Junior Gas Association to the works of Ascot Gas Water Heaters, Ltd., on June 26.

The Secretary's report was submitted, and this acknowledged the continued support which the Association had received from the gas undertakings in its area, as well as from the Senior bodies in the Industry.

The PRESIDENT finally announced that the Silver Medal presented annually by the Society of British Gas Industries to members of Junior Gas Associations for papers read during the session had been awarded to Mr. C. F. Petersen.

Traffic Vibration

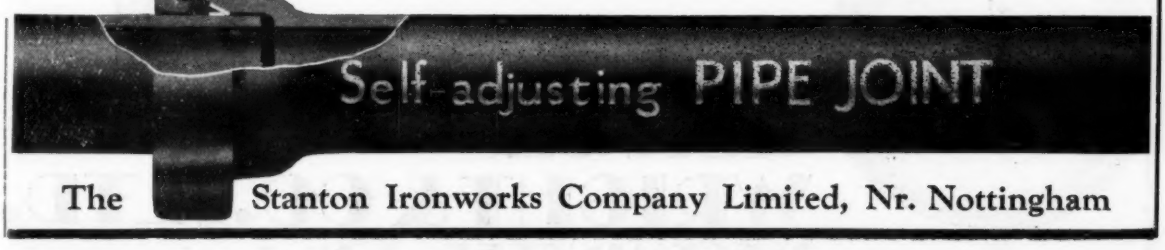
Rigid or Self-adjusting Joints?

Not many of the problems brought into being by the remarkable growth of road transport during the last decade are capable of easy solution.

There is at least one exception, however. For instance, though much has been heard of the danger caused to historic buildings by traffic vibration, the harmful effects of such vibration on water and gas mains are not so apparent. To water and gas engineers responsible, however, for the maintenance of these essential public services, this was a very real problem until a few years ago, for rigidly-jointed mains could not be expected to withstand the severe vibration caused by modern conditions.

Some six years ago the Stanton Company introduced the Stanton-Wilson Self-adjusting pipe-joint to overcome this and similar difficulties. That it has successfully done so is proved by the fact that more than 1,500 miles of Stanton-Wilson mains have now been laid by over 750 public authorities.

The **STANTON-WILSON**



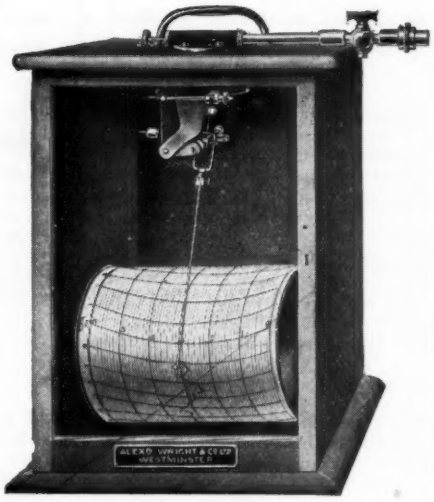
The Stanton Ironworks Company Limited, Nr. Nottingham

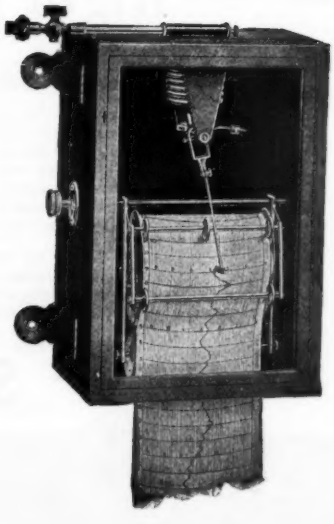
MANY POINTS OF VIEW

HAVE TO BE CONSIDERED.

That is why there is a Dead-Beat Recorder to meet practically every requirement of the practical Gas Engineer. The many different types were developed to meet the needs of individual Engineers, and they now meet the needs of most. Catalogue DB shows eleven forms of Dead-Beat Recorder, each of which is made in a large number of ranges. Numerous modified forms of the principal types are not catalogued

. . . so, let us know your requirements if catalogue DB does not show exactly what you want.





ALEXANDER
WRIGHT & CO., LTD.
WESTMINSTER. S.W.1

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Investors were more interested in the Coronation celebrations last week than in stocks and shares with the result that business was at a low ebb with prices drifting downwards. The Stock Exchange is also in the throes of a three-week account period which has included two holidays, and until this is out of the way there is little prospect of a return to brighter conditions. The general undertone, however, remains firm, though some anxiety is being felt regarding the labour situation.

Conditions in the Gas market remained much the same as a week ago, and the volume of business was well up to the average for a short session. In contrast to some sections, the market was able to record a few upward movements, which included a sharp rise of 8 points in Alliance and Dublin to 172½, while at the Provincial Exchanges Bath, Bristol, Liverpool, and Newcastle ordinaries were all marked up. Gas Light units, on the other hand, closed 3d. lower at 25s. 9d., but since the price margin is 3d. higher than a week ago there appears no justification for the drop in the quotation.

The accounts of the Associated Gas and Water Undertakings for the year to March 31 show a net revenue balance of £37,621 against £14,139 for 1935-36, while the balance forward is increased from £1,590 to £10,271. The Company now has controlling interests in 14 undertakings the holdings in which are valued in the balance-sheet at £2,145,127. The dividend of 5% was reported last week.

The accounts just published of another holding company are those of the South-Western Gas and Water Corporation, also for the year to March 31. The net revenue amounted to £21,719 (against £21,343 last year). A final dividend of 3% is recommended, making 5% for the year (same), and £132 against £242 is carried forward. The ordinary shares are now *ex* div. and obtainable at about 20s. each.

Current Sales of Gas Products

The London Market for Tar Products.

LONDON, *May* 14.

Prices of tar products in the London market generally remain unchanged, to-day's values being as follows:

Pitch, 36s. to 37s. per ton f.o.b.
Creosote, 6d.
Refined tar, 3¾d.
Pure toluole, 2s. 6d.; pure benzole, 1s. 9d.; 95/160 solvent naphtha, about 1s. 8d.; and 90/160 pyridine, about 8s.; all per gallon naked at makers' works.

Tar Products in the Provinces.

May 14.

The average prices of gas-works products during the week were: Gas-works tar, 22s. 6d. to 27s. 6d. Pitch—East Coast, 35s. to 36s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 35s. to 36s.* Toluole, naked, North, 2s. to 2s. 1d. Coal tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 6½d. to 1s. 6¾d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4¾d. to 4¾d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 3s. 7½d. to 3s. 10½d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be neecssary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *May* 15.

New business is not easy for the want of prompt supplies. Prices are, therefore, well maintained in all departments.

Crude gas-works tar.—The actual value is 36s. to 37s. per ton *ex* works in bulk.

Pitch.—Market is nominal at 30s. to 32s. 6d. per ton, f.o.b. Glasgow, for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—Considerable quantities are changing hands at round 3d. to 3¼d. per gallon free on rails for export, and 3½d. to 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—Production is well looked after and the following prices are the lowest at which business can be arranged: Specification oil, 5½d. to 5¾d. per gallon; low gravity, 5¾d. to 6d. per gallon; neutral oil, 5¼d. to 5½d. per gallon; all *ex* works in bulk.

Cresylic acid.—Demand continues strong and with supplies most difficult to secure a further advance in values is to be recorded: Pale, 97/99%, 4s. 5d. to 4s. 7d. per gallon; dark, 97/99%, 4s. 2d. to 4s. 4d. per gallon; and pale, 99/100%, 4s. 10d. to 5s. 1d. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—Only small quantities are available and command 6d. to 6½d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha is in regular call with 90/160 grade at 1s. 4½d. to 1s. 5½d. per gallon, and 90/190 heavy naphtha at 11d. to 1s. per gallon.

Motor benzole remains unchanged at 1s. 4d. to 1s. 4½d. per gallon.

Pyridine.—Prices are nominal at 7s. to 8s. per gallon for 90/160 grade, and 8s. to 9s. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 10	to	0 10½	per gallon at works
Motor ,, . . .	1 3¾	,,	1 4	,, ,, ,,
90% ,, . . .	1 4½	,,	1 5	,, ,, ,,
Pure ,, . . .	1 8¾	,,	1 9	,, ,, ,,

Contracts Advertised To-Day

Coal.

Barnoldswick Gas Department. [p. 442.]
Caernarvon Gas Department. [p. 442.]
Skipton Gas Department. [p. 442.]
Sutton-in-Ashfield Gas Department. [p. 442.]

General Stores.

Sutton-in-Ashfield Gas Department. [p. 442.]

Oxide, New Spent.

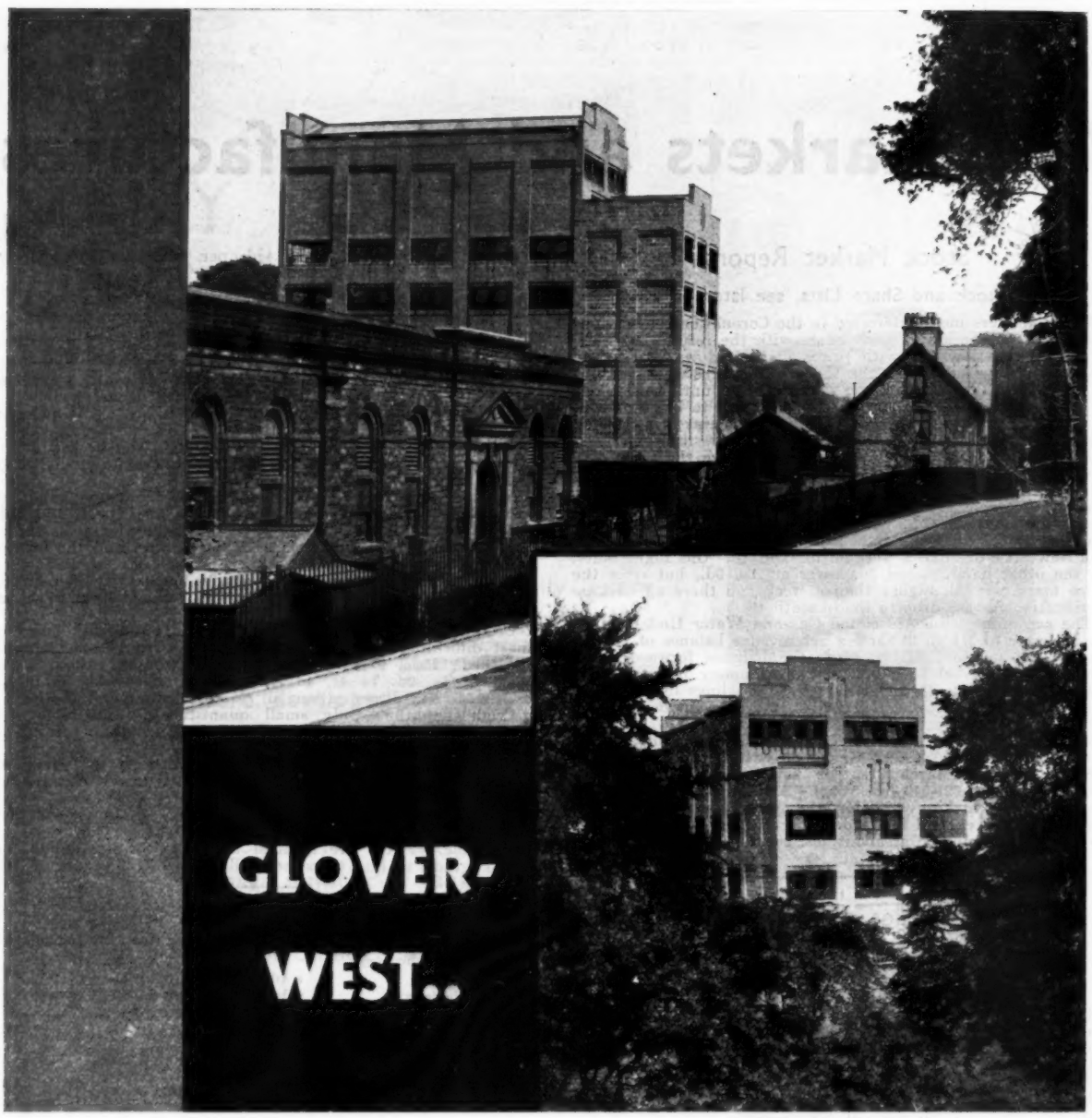
Rochdale Gas Department. [p. 442.]

Pipes and Specials.

Rochdale Gas Department. [p. 442.]

Wrought Iron Tubes and Fittings.

Rochdale Gas Department. [p. 442.]



modern Vertical Retort installations

BUXTON

A typical Glover-West plant of to-day's design installed for The Buxton Corporation Gas Department. Smoke-free operation and an attractive building are particularly important to this very famous health resort, as to many others also served by Glover-West Verticals.

400 plants in 24 countries

WEST'S GAS IMPROVEMENT CO., LTD.

MANCHESTER: ALBION IRONWORKS, MILES PLATTING ■ **LONDON:** COLUMBIA HOUSE, ALDWYCH, W.C. 2

STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations May 14.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Mar. 15	8	8	Alliance & Dublin Ord. ...	170—175	+8	...
374,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb. ...	96—101	...	...
558,890	,,	Feb. 15	7	7	Barnet Ord. 7 p.c.	160—165	...	...
300,000	1	Apl. 5	1/4⅜	1/9⅜	Bombay, Ltd.	25/6—27/6	...	...
179,915	Stk.	Mar. 1	9½	9½	Bournemouth sliding scale ...	195—205	...	...
530,407	,,	,,	7		Do. 7 p.c. max. ...	161—166	...	...
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	133—138	...	133½
50,000	,,	Dec. 14		3	Do. 3 p.c. Deb. ...	80—85	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
357,900	,,	Feb. 15	7½	7½	Brighton, &c., 6 p.c. Con. ...	155—160	...	157½
649,955	,,	,,	6½	6½	Do. 5 p.c. Con. ...	138—143	...	...
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref. ...	130—135	...	...
855,900	,,	Mar. 1	7	8	British Ord.	148—153	−2	148½—150
100,000	,,	Dec. 14	7	7	Do. 7 p.c. Pref.	143—148	...	...
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	103—108	...	...
450,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1—3	...	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1¼—3½	...	...
150,000	Stk.	Jan. 4	4½	4½	Do. 4½ p.c. Deb. ...	80—85	...	...
626,860	,,	Feb. 1	6	6	Cardiff Con. Ord.	120—125	...	...
237,860	,,	Dec. 14	5	5	Do. 5 p.c. Red. Deb.	107—112	...	...
98,936	1	Apl. 5	2/-	2/-	Colombo Ord.	1⅜—1¼	...	...
24,510	1	,,	1/4⅜	1/4⅜	Do. 7 p.c. Pref. ...	23/—25/-	...	...
739,453	1	Mar. 15	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/-	...	...
296,144	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/-	...	...
1,775,005	Stk.	Feb. 1	5	5	Commercial Ord.	88—93	...	91½—92½
620,000	,,	Nov. 30	3	3	Do. 3 p.c. Deb. ...	73—78	...	75½—77
286,344	,,	Feb. 15	5	5	Do. 5 p.c. Deb. ...	115—120	...	...
807,560	,,	Feb. 15	7	7	Croydon sliding scale ...	141—146	...	143½—146½
644,590	,,	,,	5	5	Do. max. div.	109—114	...	111½
620,385	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	115—120	...	...
239,000	,,	Feb. 1	5	5	East Hull Ord. 5 p.c.... ...	100—105	...	...
185,355	,,	Feb. 15	6	6	East Surrey Ord. 5 p.c. ...	122—127	...	...
176,211	,,	Dec. 14	5	5	Do. 5 p.c. Deb. ...	113—118	...	114
250,000	1	Nov. 16	4	4	Gas Consolidation Ord. ...	20/—22/-	...	20 6
250,000	1	,,	4	4	Do. 4 p.c. Red Cum. Pref.	19/—21/-	...	...
19,255,284	Stk.	Feb. 1	5⅞	5⅞	Gas Light & Coke 4 p.c. Ord.	25/3—26/3a	−3	25/6—26/1½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	80—83	...	81½—83
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	100—103	...	101—101½
8,602,497	,,	Nov. 30	3	3	Do. 3 p.c. Con. Deb. ...	79—82	...	80½—82
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—113	...	...
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	108—111	...	111—112
700,000	,,	Mar. 1	25/5⅝	3½	Do. 3½ p.c. Red. Deb....	98—101	...	100—101
270,466	,,	Feb. 15	6	6	Harrogate New Cons. ...	122—127	...	...
213,200	,,	Feb. 15	6	6	Hornsey Con. 3½ p.c. ...	120—125	...	...
5,600,000	,,	Nov. 2	12	8	Imperial Continental Cap. ...	155—160	...	155½—159½
223,130	,,	Feb. 1	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...	...
285,242	,,	Mar. 1	8½	8½	Lea Bridge 5 p.c. Ord. ...	160—165	...	...
11,751	,,	Mar. 1	8	10	Maidstone Gas 5 p.c. Cap. Stk.	180—190	...	...
63,480	,,	Dec. 14	3	3	Do. 3 p.c.Prp.Db.Sk.	72—77	...	...
75,000	,,	Nov. 30	†10	†10	Malta & Mediterranean ...	150—160	...	152
392,000	—	Apl. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Feb. 15	5	5	M.S. Utility 'C' Cons. ...	102—107	...	...
968,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95—100	...	98½
360,075	,,	Dec 14	4	4	Do. 4 p.c. Deb. ...	97—102	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	115—120	...	...
125,000	—	Jan. 4	3½	3½	Do. 3½ p.c. Rd.Rg.Bds.	97—100	...	...
675,000	Stk.	May 3	†6	†9	Montevideo, Ltd.	85—90*	...	88—89
250,000	,,	Feb. 15	7½	7½	North Middlesex 6 p.c. Con.	152—157	...	...
396,160	,,	Feb. 1	5	5	Northampton 5 p.c. max. ...	102—107	...	...
300,000	,,	Apl. 19	†9	†7	Oriental, Ltd....	162—167	...	...
416,617	,,	Dec. 14	8	8	Plymouth & Stonehouse 5 p.c.	165—170	...	...
621,667	,,	Feb. 15	8½	8½	Portsmouth & Gosport Cons.	167—172	...	170
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	105—110	...	104½
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	112—117	...	...
441,275	1	May 3	1/-	1/1⅛	Severn Val. Gas Cor. Ld. Ord.	20/6—22/6*a	...	22/6—22/9
460,810	1	Mar. 15	-/10⅛	-/10⅛	,, ,, 4½ p.c. Cum. Pref.	20/—22/-	...	...
133,201	Stk.	Feb. 15	5	8⅛	Shrewsbury 5 p.c. Ord. ...	133—138	...	...
90,000	10	June 8	‡3⅛	‡4	South African...	4—5	...	...
1,371,752	1	May 3	1/2⅜	1/2⅜	South East'n Gas. Cn.Ld. Ord.	24-/—26/-*	...	24/9—25/9
871,636	1	Mar. 1	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	20,3—21/-
498,818	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	19/6—21/6	...	...
450,000	,,	Feb. 15	4	4	Do. 4 p.c. Deb.	100—102	...	...
150,000	Stk.	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	99—101	...	...
6,709,895	,,	Feb. 1	5	6	South Met. Ord.	107—112	...	108—109½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	132—137	...	132⅜
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	96—101	...	...
1,895,445	,,	Dec. 14	3	3	Do. 3 p.c. Deb. ...	74—79	...	76½
1,000,000	,,	Jan. 4	5	5	Do. 5 p.c. Red. Deb....	107—112	...	...
1,543,795	,,	Feb. 1	6	6	South Suburban Ord. 5 p.c....	122—127	...	124
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	112—117	...	114
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	95—100	...	95—97
888,587	,,	Dec. 14	5	5	Do. 5 p.c. Deb....	115—120	...	115½
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	98—103	...	99
427,859	1	May 3	9⅜	1/2⅜	S. Western Gas & Water Ord.	19/—21/-*	...	...
160,523	1	Apl. 19	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pf.	20/—22/-	...	...
110,000	Stk.	Dec. 14	4	4	Do. 4 p.c. Red. Deb. ...	98—103	...	...
750,541	,,	Feb. 1	5	5½	Southampton Ord. 5 p.c. ...	111—116	...	112—113
148,836	,,	Jan. 4	4	4	Do. 4 p.c. Deb.	98—103	...	...
350,000	,,	Feb. 15	5½	5½	Swansea 5½ p.c. Red. Pref. ...	110—115	...	113—114½
106,000	,,	Jan. 4	6½	6½	Do. 6½ p.c. Red. Deb. ...	98—101	...	...
94,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
1,076,490	,,	Feb. 15	6⅝	6⅝	Tottenham and District Ord.	137—142	...	140—141½
409,835	,,	,,	5½	5½	Do. 5½ p.c. Pref....	123—128	...	125½
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
371,850	,,	Nov. 30	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
373,939	,,	Feb. 15	7	7	Uxbridge, &c., 5 p.c. ...	142—147	...	...
133,010	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,371,138	,,	Feb. 1	7	7	Wandsworth Consolidated ...	142—147	...	145½—146½
1,620,615	,,	,,	5	5	Do. 5 p.c. Pref ...	113—118	...	116
500,000	,,	,,	33/4	4	Do. 4 p.c. Pref. ...	95—100	...	...
1,343,964	,,	Dec. 14	5	5	Do. 5 p.c. Deb. ...	117—122	...	...
383,745	,,	,,	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
558,342	,,	Feb. 1	7	7	Watford and St. Albans Ord.	142—147	...	145½
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
200,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	123—128	...	...
200,000	,,	Dec. 14	4	4	Do. 4 p.c. Red. Deb.	97—102	...	...
100,000	,,	,,	3½	3½	Do. 3½ p.c. Red.Deb.	95—100	...	...

a.—The quotation is per £1 of Stock. * Ex div. † Paid free of income-tax. ‡ For year. ⅛ Actual.

Stock and Share List continued overleaf.

A Manual of

Carbonization

in

Horizontal Retorts

by G. M. GILL, M.I.Mech.E., M Inst.Gas E.

A Glossary of the Contents :

What is Carbonization ?

Loss of Gas : its Cause and Prevention.

Bad Gas : its Cause and Prevention.

Direct Fired Furnaces.

The Producer Type of Furnace.

Ascension, Bridge and Dip Pipes.

The Hydraulic Main.

The Retort House Governor.

Charging and Discharging Retorts.

Regulation of Retort Settings.

Handling of Hot Coke.

Sundry Points of Importance,

Methods of Diluting Coal Gas.

Thermal Efficiency as a Check on the working of Carbonizing Plant.

PRICES : Single Copy 1/-
12 copies 10/- ; 100 copies 75/-
All post free

WALTER KING, LTD.
"Gas Journal" Offices
11, Bolt Court, Fleet St., E.C.4

STOCK AND SHARE LIST—Cont.

Stocks Officially Quoted on Provincial Exchanges

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. May 14.	Rise or Fall on Week.	Transactions, Lowest and Highest During the Week.
BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 1	5	6	Bath Cons.	121—123	+1	...
1,667,250	,,	Feb. 15	5	5	Bristol, 5 p.c. max.	114—116	+1	...
120,420	,,	Dec. 14	4	4	Do. 1st 4 p.c. Deb. ...	101—103	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	101—103	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	122—125	...	...
274,000	,,	Mar. 1	5	5	Newport (Mon.) 5 p.c.max. ...	103—108	...	...
13,200	12	Mar. 15	7	8	Pontyp'l Gas & W. 10 p.c. 'A'	13½—14½	...	...
13,600	10	,,	5	6	Do. 7 p.c. 'B'	12—12½	...	...
40,000	10	,,	5	6	Do. 7 p.c. 'C'	12—12½	...	...
140,778	Stk.	Feb. 1	5	5	Weston-super-Mare Cons. ...	112—113	...	...
64,338	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	98—101	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	160—163	...	...
LIVERPOOL EXCHANGE.								
157,150	Stk.	Feb. 1	5	6½	Chester 5 p.c. Ord.	106—111	...	...
92,500	,,	Dec. 14	4½	4	Do. 4 p.c. Pref.	98—102	...	...
36,430	,,	,,	3	3½	Do. 3½ p.c. Deb.... ...	90—95	...	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	99—103	...	...
2,167,410	,,	Feb. 15	6	6	Liverpool 5 p.c. Ord. ...	124—126	+1	...
245,500	,,	Dec. 14	5	5	Do. 5 p.c. Red. Pref. ...	101—106	...	...
306,083	,,	Jan. 4	4	4	Do. 4 p.c. Deb. ...	103—105	...	...
106,280	,,	Feb. 1	10	10	Preston 'A' 10 p.c.	210—220	...	...
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	150—160	...	...
NEWCASTLE EXCHANGE.								
122,577	Stk.	Feb. 1	8	8	Blyth 5 p.c. Ord.	166—168	...	...
732,000	,,	Feb. 15	5	5	Hartlepool G. & W. Cn. & New	125—127	...	...
2,061,315	,,	Feb. 1	5	5½	Newcastle & Gateshead Con.	25 9—26 3*d*	+-/6	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	100—102	+1	...
776,706	,,	Jan. 4	3½	3½	Do. 3½ p.c. Deb. ...	92—93	...	...
277,285	,,	Nov. 2	5	5	Do. 5 p.c. Deb. '43...	108—109	...	...
332,351	,,	Feb. 1	6	6	Sunderland 6 p.c. max. ...	139—141	...	...
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Mar. 1	7	9	Derby Con.	155—175	−5	...
55,000	,,	Dec. 14	4	4	Do. 4 p.c. Deb.	100—105	...	...
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	...
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	...
20,000	10	Dec. 14	5	5	Do. 5 p.c. Pref. ...	10—12	...	...
80,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...	...
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	210—220	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	210—220	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—210	...	...
1,806,339	,,	Feb. 15	6	6½	Sheffield Cons.	143—145	...	...
95,000	,,	Jan. 4	4	4	Do. 4 p.c. Deb.	101—104	...	...

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Mar. 15	25/-*b*	25/-*b*	Ascot Ord.	102—107	...	...
128,182	,,	Jan. 4	5	5	Do. 5 p.c. Pref.	110—115	...	111½
312,083	1	Nov. 16	5	5	Assd. Gas and Water Ord. ...	19/6—21/6	...	21/-—21/3
326,071	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	19/6—21/6	...	...
150,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
17,000	,,	Feb. 15	8	8	Bognor Orig. Ord. 'A' ...	160—170	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	160—170	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	140—145	...	...
37,440	,,	Feb. 1	10	10	Cam. Univ. & Town 10 p.c.max.	195—205	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	137—142	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	98—103	...	100
65,000	,,	Mar. 1	7½	8½	Eastbourne 'A' 5 p.c.	160—165	...	...
198,000	,,	,,	6	7	Do. 'B' 3½ p.c.	130—140	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
130,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	115—120	...	...
24,000	30	Feb. 1	8½	8½	Great Yarmouth 8½ p.c. max.	45—50	...	...
59,400	30	,,	7½	7½	Do. 7½ p.c. max.	40—45	...	...
51,160	Stk.	Dec. 14	5½	5½	Do. 5½ p.c. Deb.	122—127	...	...
152,600	,,	Feb. 15	8	9	Guildford Cons.	190—200	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	112—117	...	...
68,250	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	115—120	...	...
156,600	,,	Feb. 15	7½	7½	Hampton Court Cons. ...	150—160	...	...
107,960	10	Mar. 15	4	5½	Mid Kent Ord.	9—10	...	...
230,940	Stk.	Feb. 15	10	10	Oxford & District Ord. ...	200—210	...	...
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	112—117	...	...
126,193	,,	May 3	7½	7½	Peterborough Ord.	159—169*	...	...
64,990	,,	Mar. 15	6½	7½	Redditch Ord.	127—137	...	...
166,850	,,	Feb. 15	8	8	Romford Ord.	157—167	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 15	5	5	Do. 5 p.c. Deb.	115—120	...	...
10,950	,,	Mar. 1	8	8	Ryde Ord.	160—165	...	...
136,191	,,	Feb. 15	5	7	Scarborough Ord.	123—133	...	...
27,825	,,	Feb. 1	8	8	Shanklin & Ventnor Cons. ...	158—168	...	...
270,086	,,	Mar. 15	7	7	Slough Ord.	137—142	...	...
21,000	,,	Dec. 14	5	5	Do. 5 p.c. Deb.... ...	113—118	...	...
28,872	1	Nov. 2	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—22/-	...	...
28,866	1	Mar. 15	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...	...
137,730	Stk.	Feb. 15	7	7	Southgate & Dist. 7 p.c. max.	135—145	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
117,228	,,	Feb. 15	6	5	Swindon Cons.	108—113	...	...
60,425	,,	Dec. 14	5	5	Do. 5 p.c. Deb.	113—118	...	...
64,380	,,	Dec. 14	5	5	Torquay and Paignton 5 p.c. Pf.	115—120	...	...
750,000	1	Apl. 5	4	6	Utd. Kingdom Gas Cpn. Ord.	20/6—22/6	...	21/9—22/-
936,338	1	May 3	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-*	...	21/3
674,084	1	Apl. 5	4½	4½	Do. 4½ p.c. 2nd Non-Cum. Pref.... ...	18/6—20/6	...	19/3
600,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...	97¾
130,000	,,	Feb. 15	5	8	Wakefield Ord.	132—137	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	Feb. 1	6	6	Weymouth Ord.	103—108	...	...
98,384	,,	Feb. 1	6	6	Wolverhampton 6 p.c. Pref....	125—130	...	...
160,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Rd. Db	110—115	...	...
370,000	,,	Feb. 15	4	6	York Cons.	105—110	...	...
90,000	,,	Dec. 14	5	5	Do. 5 p.c. Red. Deb. ...	105—110	...	...
133,640	,,	Mar. 1	6½	6½	Yorktown (Cam.) 5 p.c ons.	130—135	...	...
120,000	,,	,,	5	5½	Do. 5 p.c. Pref.	110—115	...	...
35,000	,,	Dec. 14	5½	5½	Do. 5½ p.c. Deb.	125—130	...	...

a The quotation per £1 of Stock. *b* Actual for Quarter. * Ex div.

COMPANY NOTICES.

THE MALTA AND MEDITERRANEAN GAS COMPANY, LIMITED.

TO THE PROPRIETORS.

NOTICE is Hereby Given that an ORDINARY GENERAL MEETING of the Proprietors of the Company will be held at the Offices, 5, Great Winchester Street, Old Broad Street, London, E.C. 2, on Tuesday, 1st June, 1937, at Twelve o'clock noon, to receive the Report of the Directors and the Accounts for the Year ended 31st March, 1937; to declare Dividends; to elect Auditors and to fix their remuneration; and to transact the General Business of the Company.

One of the Directors, Mr. ALFRED WILLIAM OKE, B.A., LL.M., retires from office, and offers himself for re-election.

The Auditors, Mr. WILLIAM CASH, F.C.A., and Mr. HYDE CLARKE BURTON, F.C.A., retire, and offer themselves for re-election.

The TRANSFER BOOKS WILL BE CLOSED from the 24th day of May until the day of the Meeting, both days inclusive.

By order of the Board,
G. MURRAY BURTON,
Secretary.

5, Great Winchester Street,
Old Broad Street, E.C. 2,
May 4, 1937.

STRACHAN & HENSHAW LTD.
MANUFACTURERS **BRISTOL.**
and CONTRACTORS for
HANDLING PLANT
SCREENS, TIPPLERS, ETC.

TROTTER, HAINES & CORBETT LIMITED
BRETTEL'S ESTATE
FIRE-CLAY & BRICK WORKS
STOURBRIDGE
Manufacturers of GAS RETORTS, GLASSHOUSE FURNACE & BLAST FURNACE BRICKS, LUMPS TILES, and every Description of FIRE BRICKS.
Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.
LONDON OFFICE: E. C. BROWN & Co., LEADENHALL CHAMBERS, 4, ST. MARY AXE, E.C.

GAS FIRED AIR HEATERS
AND
HAIR DRYING PLANT
FOR SWIMMING BATHS
LIGHT IN WEIGHT—OCCUPY VERY SMALL SPACE
CONTROLLED FUMIGATION, LTD.,
83, Institution Street, Leeds 6
J. R. MARSDEN - TECHNICAL DIRECTOR

CONTENTS

EDITORIAL NOTES.

Smoke Abatement 503
Smokeless Zones 503
Industrial Smoke 504
Advances in America 504

Correspondence—
"The Science and Practice of Gas Supp" 505
Personal—
Coronation Medals 505
Obituary 505
Forthcoming Engagements 505
News in Brief 506
Pieces of Eight! 506
Amalgamation and Grouping—
Pontypool and Cwmbran and Pontnewydd 506
South-Western and Glastonbury . . . 506
Tottenham Standard Price Unaltered—
Middlesex County Council's Application Rejected 506
South Metropolitan Company's Gas Sign . 506
Institution of Gas Engineers Membership . 506
Women's Gas Council—
Manchester Branch Entertained by Ascot's 507
Bradford Visit Wilsons & Mathiesons, Ltd. 507
Kitchen Fashions and Food Shows—
Sheffield's Ambitious Programme . . 507
A Coronation Window Display 507
Further News and Views of the Industry's Part in the Recent Coronation Festivities 508–9

ANNUAL MEETING OF THE I.G.E.

A Well-Balanced Programme 510
Programme of the Meeting 511
How to Reach the Meeting 511

INSTITUTION AUTHORS WITH SUMMARIES OF THEIR COMMUNICATIONS—

H. J. Escreet, B.Sc.Eng. 512
R. N. LeFevre, A.I.Mech.E. 512
C. F. Broadhead, M.Inst.Gas E. 513
H. Hollings, M.Sc. 513
G. M. Gill, M.I.Mech.E. 514
C. A. Masterman, M.A., M.I.Mech.E. . . 514
E. G. Stewart 515

ABSTRACT OF COMMUNICATIONS.

The Consolidation of Gas. By C. F. Broadhead 516
The Estimation of Nitric Oxide in Gas. By H. Hollings 522
Changing Influences in Gas Manufacture. By E. G. Stewart 524
Distribution of Gas in Suburban and Rural Areas. By H. J. Escreet 529
Technical Aspects of the Holding Company Movement. By G. M. Gill 534
The Future of Gas Appliance Design. By C. A. Masterman. 537
Consumer Service. By R. N. LeFevre . 546

Home Production of Oil—Mr. J. Jamieson on the Potentialities of Cannel 555
Ararat's New Community Hospital—Gas Provides Essential Services 555
Tar and Ammonia in 1936—Increased Production of Sulphate of Ammonia 555
A Correction 555
General Gas and Electricity Company, Ltd.—Visit to the Works of George Wilson Gas Meters, Ltd. 556
The Glories of York Enhanced by Gas Floodlighting 557
Eastern Counties Gas Engineers' and Managers' Association—
Meeting at Aldeburgh 559
Luncheon 559
Dinner 560
Golf Competition 560
Illuminating Engineering Society—Annual General Meeting 560
Midland Junior Gas Association—
Flues for Instantaneous Gas Water Heaters. By Leopold Friedman 561
Athletic and Social—
Edinburgh Gas Department Picnic . . . 565
How Leamington Celebrated the Coronation 565
Gas Undertakings' Results 565
Associated Gas and Water Undertakings, Ltd.—Ordinary General Meeting 566
South-Western Gas and Water Corporation—Annual General Meeting 567
Gas Markets and Manufactures—
Stock Market Report 569
Current Sales of Gas Products 569
Contracts Advertised To-Day 569

Stock and Share Lists 571–72

For Advertisers' Index see PAGE 499

SCREWED AND SOCKETED
TUBES AND FITTINGS

S·T·C

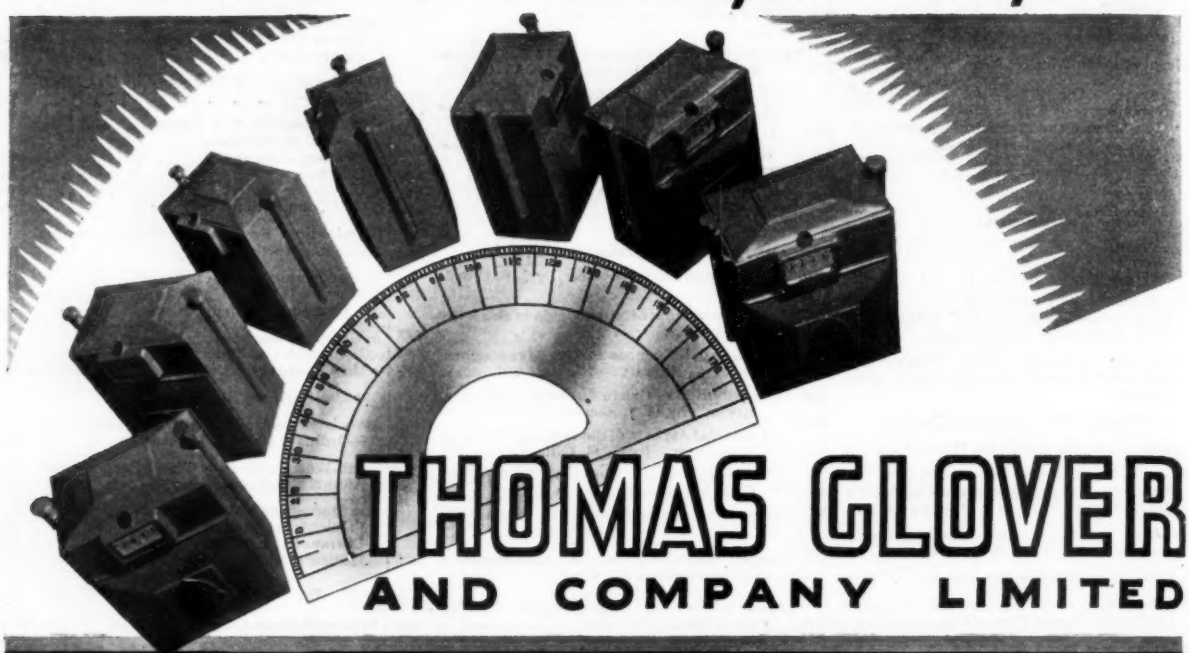
S.T.C. WAREHOUSES :—

LONDON : MANCHESTER
NEWCASTLE-ON-TYNE
LEEDS : LIVERPOOL
CARDIFF : SHEFFIELD
ST. AUSTELL

Send your Enquiries to your nearest S.T.C. Warehouse.

THE
SCOTTISH TUBE
COMPANY LIMITED
34 Robertson Street, Glasgow.

Accurate to the Highest Degree!



THOMAS GLOVER
AND COMPANY LIMITED

EDMONTON, LONDON, N.18 and BRANCHES.

W. PARKINSON & CO.
INCORPORATED IN
PARKINSON & COWAN (GAS METERS) LTD.

METER & LAMP
SPECIALISTS

LONDON, BIRMINGHAM AND
BELFAST